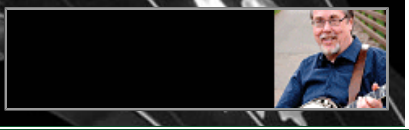


rudy

Rudy
United States
7342 posts
since 3/27/04

3/7/2015 4:53 PM

9 people like this Like Report to Moderator

If you're a seasoned builder this topic isn't going to be of much interest for you, but if you have a desire to build a banjo but the complexity, expense, and lack of a fully equipped shop and specialized tooling is holding you back, you might just be in the right place.

Open comments and discussion are certainly welcomed by all, but do remember that this particular build topic is done with the newbie in mind. The majority of the techniques demonstrated aren't considered as "standard practice" by the luthiery community, but this topic is all about successful outcome, and not an exercise in frustration.

What it's all about, where we're headed, and a road map to get there:

There are many reasons why someone might desire to make their own banjo, but you have to actually START somewhere, and that's the sticking point for many. As with any craft, it's still true that you have to learn to walk before you can run, and instrument construction is no different. My goal is to present you with an introduction to banjo building without the need for a large shop, specialized tools, or a huge outlay in time or materials. To that end, I've done this topic not with how I construct a banjo, but how someone with very modest resources might choose to do it. I want YOU to be successful, with the end result being a banjo that is both satisfying to play and will provide to you the pleasure of playing an instrument resulting from your efforts. Along the way you'll be introduced to some construction techniques that are purposefully designed to simplify the entire process. To that end, I've also chosen to follow the construction of a simple banjo that utilizes a Remo pre-tensioned hand drum because it makes the entire process less overwhelming for the newbie builder. Indeed, it cuts the amount of actual work in half.

Obviously you can further your skills with more complex projects, but we've got a much more to-the-point goal here.

As far as tools go, I will be using a 12" band saw, small combination 6" disk / belt sander, portable battery operated drill, a 5" random orbit sander, Dremel hobby tool, and a few assorted hand tools. There's nothing extraordinary that might not be found in the small home shop. I have other power tools at my disposal, but I'm purposefully limiting what I use to be more in line with someone just setting up a workshop.

My intentions are to make this a topic that will remain useful in the future, so I'm going to attempt to do that by using BHO's conventions as I best know how. One of the problems with photo use on the forum is that they sometimes lose their links in the process of archiving or due to some other reason I'm unaware of, even if they are parked in the same spot so inadvertent link problems aren't created. In an attempt to avoid that, I'll use the "add attachment" method of presenting photos when posting. That will require the reader to click on them to view, but hopefully will eliminate the problem of unlinked photos. I'll use a few direct photo insertions (as done above) but keep those to a minimum. In any case, if photos do become unlinked they will always be available on my home page photos in a

folder labeled as “Banjo Building 101”.

Each detail within each daily post will be NUMBERED and will have a related NUMBERED PHOTO (starting with #3) attached at the bottom of each post. It’ll be easy, take my word for it.

If the “Reply With Quote” button is used to respond to any particular post (the right way) then images won’t be pasted endlessly back into the discussion, which happens if photos are attached to the posts. That seems a sensible way to do it, at least IMHO.

Rather than waiting until the entire instrument is completed I thought it might be a more realistic approach to post periodically as the actual project progresses. This will be far more manageable for me, and I hope a bit more entertaining (and less boring) for you. The overall project is fairly simple and can be done much more rapidly, but I’m going to post this in the same manner in which I choose to work, carving out an hour or two here and there to devote to instrument work. I’m sure this is not an unfamiliar scenario for many of you. Bear with me; I’ll try to exercise due diligence and not get too sidetracked with the minutia of my everyday life...and away we go!

1. Specifications:

12” diameter 2-1/2” deep pot (commercially available Remo hand drum)
24-3/4” scale length
slotted peg head with Grover Sta-tite Deluxe cast base tuners
Grover Sta-tite Deluxe cast base tuner at 5th fret for 5th string tuning
Scooped Walnut fret board
17 Nickel-silver medium frets
Wood position markers at 3rd, 5th, 7th, 10th, 12th, 15th, and 17th frets (pearl could also be used)
1/16” plastic side dots at 3rd, 7th, 10th, 12th, 15th, and 17th frets

2. Materials and sources:

Remo walnut finish 12” hand drum with Fiberskyn 3 pre-tensioned head
(Musician’s Friend, etc. approximately $35 with free shipping)
Two pieces 24” by 2-5/8” by 3/4” walnut lumber (neck blank / dowel stick)
20” by 2-3/8” by 1/4” walnut board (for fret board)
Short length of 1/4” dowel rod (fret board position markers)
(home improvement centers, pick walnut that’s flat and one piece, not edge or end joined)
17 nickel silver medium frets (Stewart MacDonald, etc. approximately $5)
Short length of 1/16” white plastic side dot material for fret board
Grover Sta-tite Deluxe slot head guitar tuners (approximately $35)
(fret wire, rod, tuners per Stewart-MacDonald, etc.)
Aquila Nylgut Classic strings (approximately $7)
(Smakula, Elderly, or other online suppliers carry them)
Miscellaneous small hardware for assembly

3. Over the course of this topic we’re going to turn this small assemblage of parts into a banjo:

A few details:

Pot

The construction of a banjo rim is often the first stumbling block for new builders, so we'll use a Remo 12" pre-tensioned Fiberskyn 3 hand drum as a starting point for the build. This eliminates the entire process (and expense) of constructing the pot assembly. The pre-tensioned head comes ready to use, no guesswork or broken heads to worry about. Spend more time playing instead of fiddling with your nuts. In the future you can turn your efforts to rim making, but for now I want to simplify the process and get a playable instrument in your lap... THAT will provide you with the motivation to progress onward. Remember, we need to first walk before we can run.

Neck

The neck will be built using commonly available pre-planed 3/4" thick wood to eliminate any need for planing to thickness. The entire neck (with the exception of the fret board) uses only 48" of lumber cut into three sections and laminated together using 30 minute clear epoxy. The neck is made with an extended dowel stick, reminiscent of the early Minstrel banjos. This system eliminates any need for complex mating of the heel to the rim and simplifies the construction considerably.
The neck has no internal reinforcement, but the combination of hardwood and synthetic strings reduces the chance of deformation. Historically, banjos were made in this manner for a very long time and it's the eventual use of steel strings and higher tensions due to tunings used that made neck reinforcement a requirement.

Fret board

The fret board will use 1/4" "thin lumber" as available from home improvement stores as well as many on-line lumber sources. The fret slots will be cut using a common hacksaw blade. The frets will be epoxied into their slots using 30

minute clear epoxy. This process is quite easy and results in a beautiful and functional fret board. (Are you starting to think you can actually pull this off?)

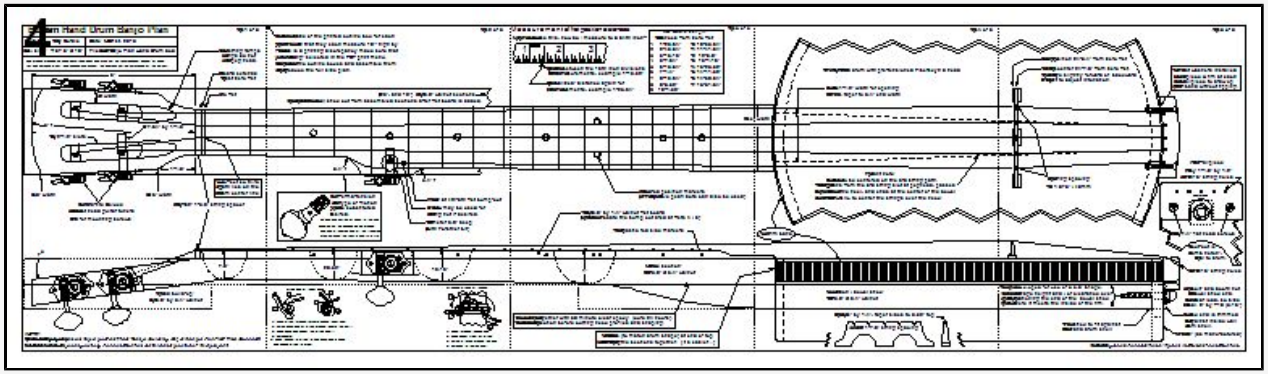
Zero Fret

Most traditional instruments use a bone or synthetic nut that requires carefully cut and shaped string slots to produce a playable instrument. We'll use a zero fret with separate string spacer and throw all that finicky stuff out with the bath water.

Tuning machines

There are areas that can be economized upon, but tuners aren't one of them IMHO. Make no mistake, quality "guitar-style" tuners have serious mojo for banjo use and work far better at less than half the cost of traditional planetary tuners. Don't be deceived about any advantages to planetary tuner use for the banjo, in all likelihood one day all banjos will use guitar style tuners. That will require many banjo players getting past the identity crisis they think will result if they don't have planetary tuners. (Don't take offense, it's said in only partial seriousness.) Until that day comes just consider yourself as being far ahead of the curve.

4. "Banjo Hangout, We have a plan..."



As with any new adventure a good road map helps establish the path, so here's the plan. Literally.

The series of 5 PDF panels are printed, trimmed along the dashed lines (it's best to cut so the remnants of the lines are just barely visible after cutting), and assembled into a full size plan that will be quite useful for completing the project. The details relayed in these topic posts and the full size print will convey virtually all of the detail needed. Since PDFs can be printed accurately, the fret locations can even be transferred directly from the print to the fret board blank. That eliminates the chance of incorrect fret placement due to a measurement error. All of the other geometric relationships are also detailed on the print.
You MUST verify that the PDFs print so that the outlined area measures 10" high (the width does vary for some panels), if you encounter difficulty printing to the exact size the details for printing correctly are shown at the top of the Page 2 PDF.

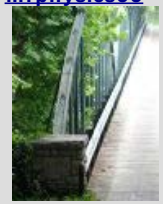
Since the third string path and neck centerline are critical to produce an instrument with the strings centered correctly over the neck a separate Page 6 PDF illustrating this graphically is also attached to this post.

page 1 page 2 page 3 page 4

page 5 page 6

Edited by - rudy on 3/20/2015 9:53 PM

mrphysics55



Eddie
Birmingham, AL
United States
4330 posts since
5/9/07

3/7/2015 5:03 PM Like Report to Moderator

Cool!

Stephen45710

Stephen Owens
Albany, OH
United States
11 posts since
4/13/11

3/7/2015 5:28 PM Like Report to Moderator

Thank you so much for the time you're devoting to this. I can't wait to follow along!

MusicManMike

Michael Evans
Brooklyn, MI
United States
51 posts since
1/23/15

3/7/2015 5:42 PM Like Report to Moderator

This is awesome!!! Im starting my first build next week. Been reading a ton and this post expanded my knowledge for sure, thanks for sharing!!! =)

Ken LeVan

Ken Levan
Shunk, PA
United States
7142 posts since
6/29/05

3/7/2015 6:03 PM Like Report to Moderator

Rudy, Thanks!

This is amazing. There has never been such a beautifully detailed and comprehensive guide before. I have read it twice, and will read it more times, but my initial two readings of it is that is a *tour de force* of banjo building instruction.

ClayTech

3/7/2015 6:06 PM Like Report to Moderator

Neil Estrick
Grayslake, IL
United States
313 posts since
1/26/12

This is fabulous! Your generosity in sharing banjo building information has reached a new peak! And the timing couldn't be better- I just rounded out two rims on my drill press yesterday. Can't wait to see the progress!

---

rudy

Rudy
United States
7342 posts since
3/27/04

3/7/2015 6:35 PM

Like Report to Moderator

Thanks for the nice comments; so many of us forum participants have been building long enough that we forget what it's like to have limited resources and an itch to build. I've got an outline and a schedule and if the creek don't rise too high I'm hoping to knock this out in a little over a week perhaps. I'm only going to put a few hours in daily, as that's what a lot of first time builders might do.

Ken, this really pales by comparison with your "Build a Banjo" series, but it's really targeted to the fence sitter. It's patterned after my building guides in form, but on a much simpler basis. I AIN'T doing 1000 photos!

Hang in there. and we'll see what tomorrow brings. That CAD stuff did take a bit of time, but that part's as done as it's going to get.

BrentSims

Brent Sims
Pueblo, CO
United States
109 posts since
12/9/11

3/7/2015 9:08 PM

Like Report to Moderator

Rudy.

Wow. This is way over the top helpful for those of us who have been pondering a built of this type. I was looking at drum heads just last night and pondering whether or not I could do it.I can't thank you enough for puttig forth all this effort.

Brent

---

mike gregory

Mike Gregory
Slippsen Falls, WI
United States
37930 posts since
12/14/05

3/7/2015 9:08 PM

Like Report to Moderator

And it's going to LOOK better than most of my stuff!

Good for you!

(By the way, I have made a couple of banjos from the Remo hand drums, and they DO look good an sound good.)

CrackerJo

United States
18 posts since
10/13/14

3/7/2015 9:27 PM

Like Report to Moderator

Thank You very much!

---

bjcole

3/7/2015 9:56 PM

Like Report to Moderator

Very much appreciated.

Edward Baptist
Durham, NC
United States
89 posts since
10/21/07

XXXris

Chris
United States
1183 posts since
9/4/04

3/7/2015 10:11 PM

Like Report to Moderator

Thanks for putting your time into this, much appreciated!

Shawn Hoover

Shawn Hoover
Indianapolis, IN
United States
514 posts since
2/13/11

3/8/2015 12:05 PM

Like Report to Moderator

I love it. Let us build banjos!

Nels

Nels
South Haven, MI
United States
3278 posts since
12/10/12

3/8/2015 6:50 PM

Like Report to Moderator

Thank you for sharing....this is a fantastic way for a beginner to get going!!

Might come back

Brian
237 posts since
11/25/14

3/8/2015 10:50 PM

Like Report to Moderator

just had to say nice job!!! would have loved this for my first build! would have saved me some wood, time, band aids.....Ha! awesome write up alot of lucky builders out there now, thanks rudy!!!

rudy

Rudy
United States

3/8/2015 11:11 PM

1 person likes this Like Report to Moderator

Day 2, Time to roll up the old sleeves and make a neck blank.

5. First, the PDFs are printed and the construction print assembled. The neck blank is glued together as shown on

7342 posts since 3/27/04

the print using 30 minute clear epoxy. The completed neck blank is shown here after curing for 8 hours and removing the clamps. The 1/4" by 2-3/8" by 20" walnut fret board blank is also shown.

Making the fret board

6. The end location, zero fret, and all fret locations are transferred directly to the board. This eliminates chances for mis-measurement of the fret locations. The end of the board is being marked in the photo; the excess will be cut off to square the end and provide a good edge for the string spacer to butt against.

7. The fret locations are marked with a ballpoint pen to make them easier to see. Don't be concerned, the lines will be completely covered by the fret crown overhang. A centerline is drawn 1-1/16" down from the top edge of the fret board blank with white pencil to make it easier to see against the walnut. A pattern of the fret board is made by printed and cut out, centered on this line and the shape drawn 1/8" outside of the pattern using the white pencil. One of the nice things about having the PDFs available is you can print and cut out as many templates and shapes as you wish at no cost.

8. First cut the rough fret board shape just outside the marked lines; there's no sense having too much excess board width and having to cut fret slots any longer than what is necessary.

The fret slots are very easy to cut using a new 32 tooth hacksaw blade. The frets will be epoxied in place, so the slot size or tang fit is not critical.

Place a strip of masking tape on the side of the blade so the correct depth of cut for the fret tang can be easily determined. This depth indication should be about 1/16" deeper than the fret tang height. Notice in the photo that a piece of fret wire has been dropped in the last slot just to the left of the saw blade to check fit and make sure the tang doesn't bottom out in the slot. Extra depth isn't a problem, but too shallow of a cut won't allow the frets to seat correctly against the face of the fret board.

A scrap of wood is clamped at each marked line to act as a saw guide. This wood block assists in keeping the blade perpendicular to the surface and give an adequate surface to hold the blade against as the cut is being started. Do be sure to clamp your guide block in the same location relative to each line. It's easy to judge the guide block placement if you clamp the block so the fret line is just to the outside of the block face. It is best to practice a few cuts on the excess material at the end before committing to the actual fret board area.
You may need to replace the masking tape a couple of times during the process of cutting the 17 slots if it begins to raise or pull away from the hacksaw blade.

9. Two lines are drawn across the neck blank at 17-1/2" (representing the end of the fret board) and 17-11/16 (representing the peg head face of the string spacer. The location can be plainly seen in the post photo that follows this one.
The top peg head angle is cut and the top leveled so the rear of the angled surface intersects with the line that delineates the front face of the string spacer. The two white lines just visible at the right side indicate the remaining flat surface where the string spacer will be located.

10. Two small brads are added to the top of the neck blank close to the center line and about 1/2" in from the ends of where the fret board will be located. They are cut off so 1/8" protrudes above the surface. The fret board is held over the center line with the fret board center line directly aligned with it. Make certain the end of the fret board is located at the 17-1/2" mark created earlier. The heel end of the fret board should be hanging over the radiused end of the neck blank slightly. The fret board is pressed down against the brad shafts to create small dents where they contact the rear surface of the fret board. Small holes are drilled where the dents have been made that are approximately 1/8" deep and match the size of the brads.
If you intend on adding the scoop at the end of the fret board BE SURE to drive that brad point deep enough so it will end up BELOW the surface of the neck scoop.

11. The edges of the board are taped and the tape is folded over the front of the fret board. This is done to prevent epoxy from running into the fret slots or wicking under the face of the board when it is clamped.

12. Both surfaces are covered lightly with 30 minute clear epoxy and the fret board located on the neck blank using the brad points in the matching fret board holes. The assembled pieces are inverted and clamped against a level and flat surface. The epoxy is allowed to cure for 24 hours before the clamps are removed.


5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12

Jonnycake White

Jon Whitney
Murray, UT
United States
1619 posts since 6/19/08

3/9/2015 3:06 PM

Like Report to Moderator

Randy - I appreciate your generosity in sharing this information with all of us.

Zachary Hoyt

Zachary Hoyt
Orwell, NY
United States
533 posts since 2/18/09

3/9/2015 3:27 PM

Like Report to Moderator

This is a great thing you are doing and would have been a handy resource when I was looking at building my first banjo. I am wondering if the choice of 30 minute epoxy is for length of open time or tonal considerations or some other reason that has not even occurred to me. I used epoxy when I built a wood strip canoe last spring but have never tried it for instruments and I would like to learn more.

Zach

Edited by - Zachary Hoyt on 3/9/2015 3:27 PM

BackDraft307

Jeff
Midland, MI
United States
186 posts since 1/6/08

3/9/2015 3:41 PM

Like Report to Moderator

Thanks Rudy!

Same good OL' Rudy... Here to help the world learn to build a banjo... His plans on his web page a very good and very easy to follow... this build is going to be cool to build.

I am going to use this for building my Daughter's boyfriend/soon to be son in-law... I hope... and Banjo. He really wants to learn but does not have the funds to buy a banjo.

question, Rudy this would be very nice once finished... Put into a PDF file and post here for all to find and use... JUST Thing out loud...

rudy

Rudy
United States
7342 posts since
3/27/04

3/9/2015 4:31 PM

Like Report to Moderator

quote:

Originally posted by Zachary Hoyt
This is a great thing you are doing and would have been a handy resource when I was looking at building my first banjo. I am wondering if the choice of 30 minute epoxy is for length of open time or tonal considerations or some other reason that has not even occurred to me. I used epoxy when I built a wood strip canoe last spring but have never tried it for instruments and I would like to learn more.

Zach

Hi Zach, I don't generally recommend epoxy use, but it's done in this case for a couple of reasons. First, due to the type of stack laminated neck and the fret board attachment I've chosen epoxy because it won't introduce bow as a water-based adhesive might do. Since there's no neck reinforcement we're looking for a good neck out of the chute with no need to counteract any induced bow caused as a result of adhesive choice. That's not normally much of an issue with laminated necks which have the grain oriented vertically, but we're going for an easy build here without the complications that those methods of construction can present.

It's also beneficial because the build isn't complicated by using multiple adhesives, the same one is being used for bonding frets in their slots.

There's no consideration given here to sound qualities, and the 30 minute clear epoxy is a good choice because it's easy to find and gives long enough working times without being overly fussy to work with.

Edited by - rudy on 3/9/2015 4:45 PM

rudy

Rudy
United States
7342 posts since
3/27/04

3/9/2015 4:44 PM

Like Report to Moderator

quote:

Originally posted by BackDraft307
Thanks Rudy!

Same good OL' Rudy... Here to help the world learn to build a banjo... His plans on his web page a very good and very easy to follow... this build is going to be cool to build.

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...and that's precisely why it's being posted here as a topic. Banjo Hangout is obviously the best choice for something that is going to be easy for any future readers to find. Hopefully it will be around long after I'm not.

When I considered doing this type of project I spent a good bit of time thinking about how it could be presented so it would remain in a usable form. So many folks don't realize that when they do something as simple as manipulating one of their home page photos that they may affect links that they posted and have long ago forgotten about. It's even worse for those that link to servers not associated with Banjo Hangout. Very few think about the consequences of what happens with archived discussion links once a bit of time has passed.

All of the photos for this post will be in a dedicated folder on my home page here, and I won't be doing any changing on the file structure or photos. As long as Eric keeps his server organized in the same manner we should be good to go. I even e-mailed Eric directly with concerns about the PDF links, so it's about as solid as I can make it.

I certainly will consider any suggestions, though.

Thanks!

rudy

3/9/2015 10:15 PM

Like Report to Moderator

Rudy
United States
7342 posts since
3/27/04

Day 3 - Making a fret board and rough shaping the neck blank

13. The masking tape is pulled back carefully at an angle to prevent pulling up any of the wood fibers on the top of the fret board. All that tape and glue on the sides is of no concern, as it's all going to get cut away when we cut the neck profile.

14. While the neck is still square on the sides it is a good time to draw out the side profile and cut away the excess material from the rear of the neck.

15. An additional pattern is cut for the peg head shape by printing out the page 1 PDF. (See how handy having those PDFs around is?) The top surfaces of the neck blank are covered with light green painter's masking tape and the fret board and peg head shapes are transferred to the tape-covered surface.

16. Here's an important part. Draw a NEW center line from the THIRD STRING location at the end of the fret board at the peg head end, extending THROUGH the center of the neck heel all the way to the dowel stick end. The net result of this is the end of the new centerline will be shifted upward on the end of the dowel stick by 1/8". Why do we do this? Because it's vitally important that the dowel stick portion of the neck is angled slightly from the heel to the end, as this will ensure the strings are properly s\centered over the neck when the instrument is assembled. NOW would be an excellent time to carefully review the extra "Page 6 PDF" that explains this process in detail.

17. Two lines are drawn on the masked area to delineate the canted dowel stick. Each line is drawn 3/4" from the center line at the heel and extended to 3/8" from the center line at the end. The result will be the canted dowel stick tapering from 1-1/2" to 3/4" at the end. As a brand-new builder please go over "Page 6 PDF" and review the construction drawing until it becomes clear to you that the slight angling of the neck is what determines the centering of the strings over the heel end of the neck. Remember, one of the purposes of this entire exercise in building your first instrument is so you can understand the mechanics behind what it takes to make an instrument with the proper geometric relationships.

18. Now we see how leaving that extra bit of material allows us to cut the neck out without any need to remove all of that tape or glue squeeze out. Cut the outline carefully, as you are determining the exact dimensions of the finished neck in this process.

19. The excess overhang of the fret board at the end can be sanded to match the pre-radiused neck shape with a 2" 80 grit sanding drum held in a portable drill.

20. All of that tape is peeled off to reveal something that is indeed starting to look like a neck. We're getting close, but tomorrow's another day and there's bowling to be done in the morning!


13


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20

Shawn Hoover

3/10/2015 10:20 PM

Like Report to Moderator

quote:

Shawn Hoover
Indianapolis, IN
United States
514 posts since
2/13/11

Originally posted by rudy

quote:

Originally posted by BackDraft307
Thanks Rudy!

Same good OL' Rudy... Here to help the world learn to build a banjo... His plans on his web page a very good and very easy to follow... this build is going to be cool to build.

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question, Rudy ***this would be very nice once finished... Put into a PDF file and post here for all to find and use...*** JUST Thing out loud...

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I certainly will consider any suggestions, though.

Thanks!

A BHO topic is a great way to find this (which is so excellent, btw) and discuss questions as the sections are updated, but IMHO a single document rolling up the series would be much easier to both study and use in the shop as opposed to sifting through a thread interposing discussion (like this post!). If you want to talk long term, a PDF or web page with pictures saved on multiple builders' computers could also organically survive BHO should it ever close up shop or change policies in a way you don't agree with.

rudy

Rudy
United States
7342 posts since
3/27/04

3/10/2015 11:03 PM

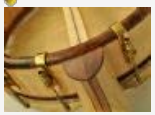
Like Report to Moderator

Hi Shawn, I'll strongly consider doing that when completed. A "complete" pdf is a good way of disseminating the information in a way that can be freely passed around, and that would be good to do.

There will be a few things I'll more than likely do You tube links to, and although you can include hyperlinks within a pdf I'll have to check out how well I can implement that. I certainly think that any comments of discussion are important to the project and I'm not sure if that can be included without seeming a bit odd...

I'll post another batch of steps tomorrow as my editing time was abbreviated by tossing a 10 pound ball in a gutter for half the day.

Shawn Hoover



Shawn Hoover
Indianapolis, IN
United States

3/11/2015 5:42 AM

Like Report to Moderator

Oh, you were literally bowling? I thought that was a teaser that was going to tie into the banjo build somehow

I wanted to pop back in to say don't mind me, though (seriously). As long as you've got a publishing medium that works for you while leaving plenty of energy for actual building (and bowling), we're all able and more than happy to take it all in. The real work is in the design and plan. This is a masterfully conceived gift to would-be builders. I am blown away by how it all fits together to achieve the stated goals.

514 posts since 2/13/11

rudy

Rudy
United States
7342 posts since 3/27/04

3/11/2015 7:32 AM

1 person likes this Like Report to Moderator

Not to worry, there's still a bit of energy left after bowling with the guys I hang with; we look less like serious competition and more like a Cialis commercial. I am pretty sure that one of them is sneaking off to the bathroom and using performance-enhancing nasel spray, though. There's always somebody that wants to get a leg up on the competition...

I'm glad you find the concept and presentation useful. The idea behind it came to me while doing the "Three String Guitar" project:

http://www.bluestemstrings.com/pageGuitarThreeString.html

I realized that the same concept would work quite well for a simple banjo build, and that's how we've arrived at this point.

Edited by - rudy on 3/11/2015 7:37 AM

Compose quick reply:

Plain Text Rich Text **Add Attachments**

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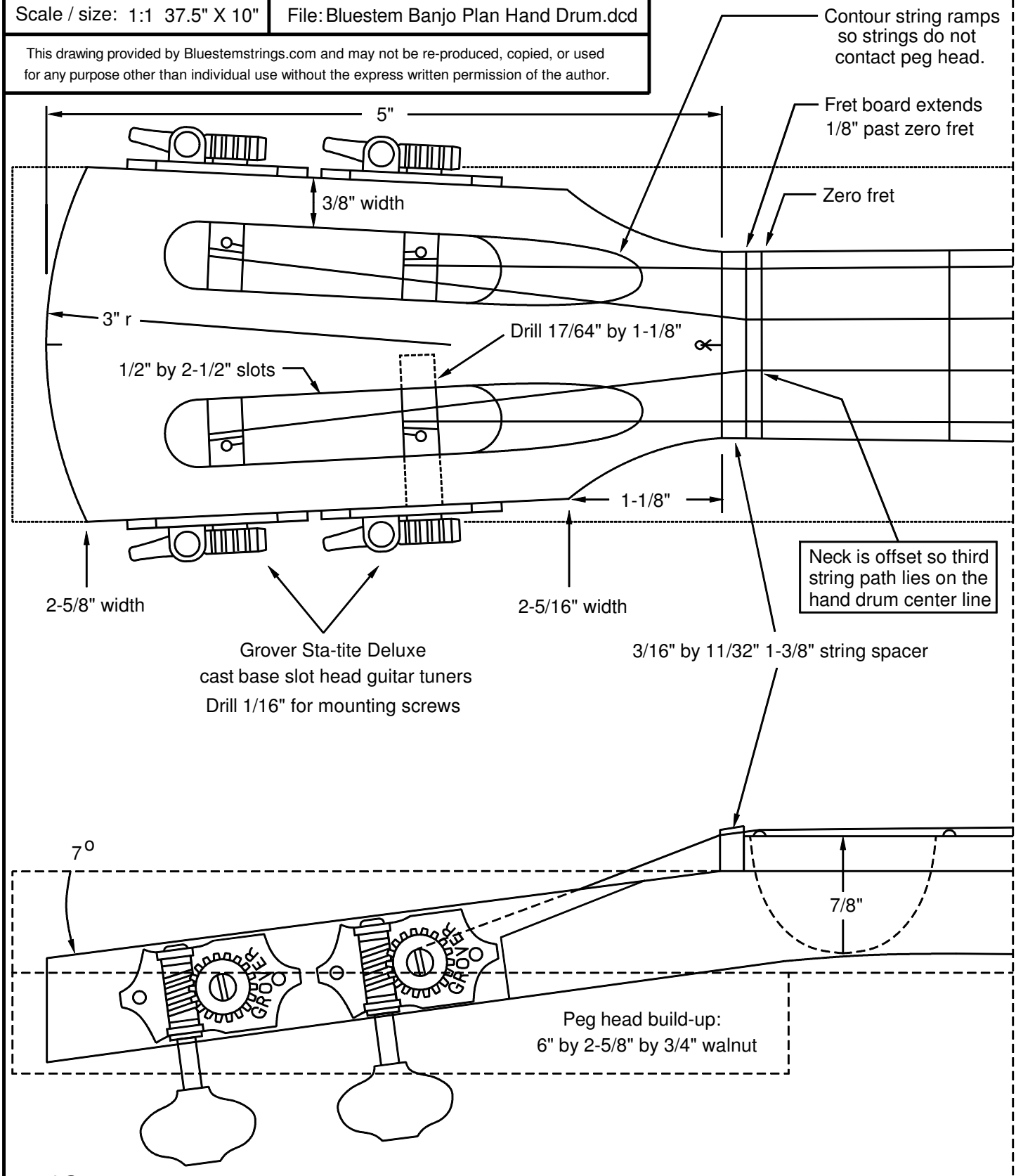
Attachment List

Your attachment list is currently empty. Add attachments.

Bluestem Hand Drum Banjo Plan

Drawn by: Randy Cordle	Date: March 1st, 2015
Scale / size: 1:1 37.5" X 10"	File: Bluestem Banjo Plan Hand Drum.dcd



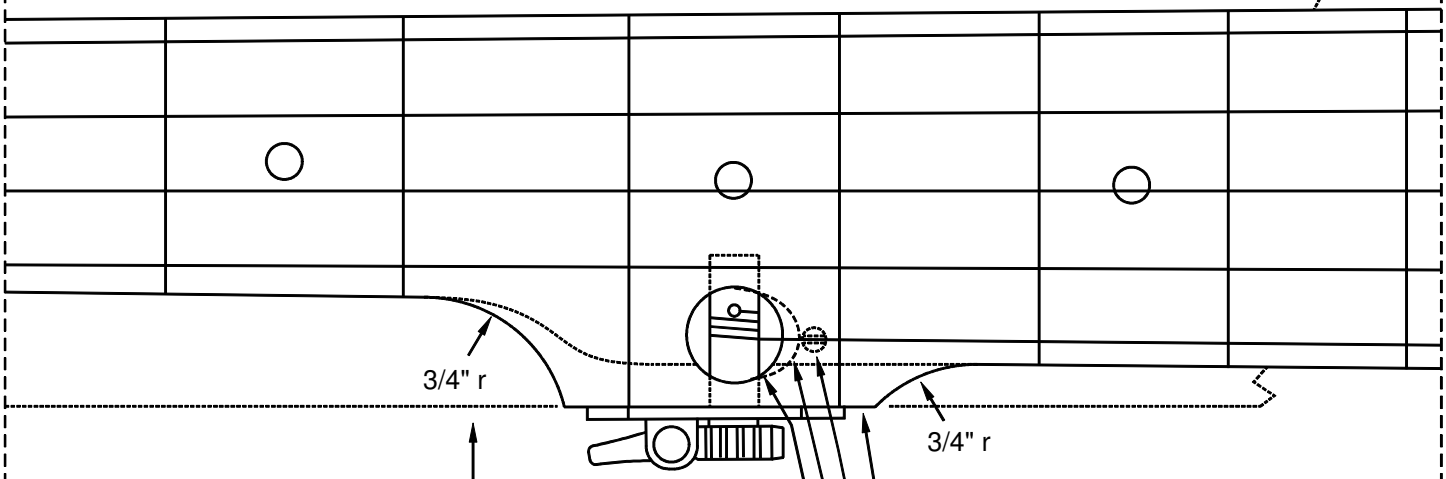
NOTE:

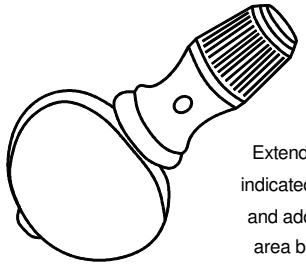
This plan to be used with Banjo Hangout companion topic post entitled "Banjo Building 101, A Recipe For First Time Success". Please use the search function at www.Banjohangout.org for construction details and photos of this project.

Be sure to check the size of the printed outline box for each page and make certain that they each measure 10"" high by 7-1/2" wide. If there is a printing discrepancy make sure that you have "No Scaling" selected in the PDF print menu.
Cut along the sides of the outline boxes and assemble them with tape to produce the full size plan.

(6", 23", and 18") 3/4" by 2-5/8" walnut sections

All 3 glued together and neck / dowel stick cut from assembled sections after fret board is added.





Grover Perma-tension or other type of friction peg can be substituted if desired.

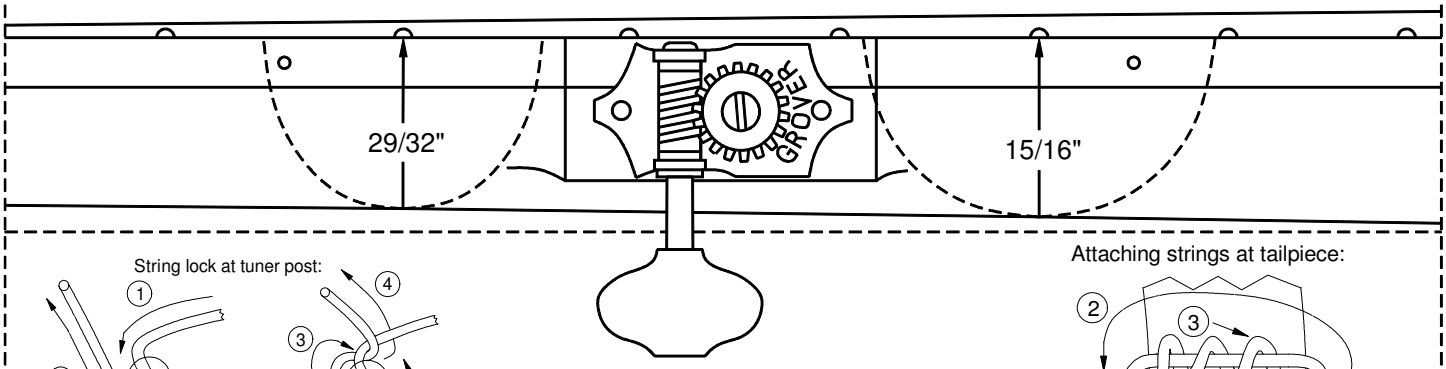
Extend long portion of neck to the point indicated by the dashed line on drawing and add a tapered hole at the transition area between the fourth and fifth fret.

2-1/16" width at 4th-5th fret bump-out

Small screw may be used for a 5th string guide if desired. (Not required)

Chamfer edge that string bears upon

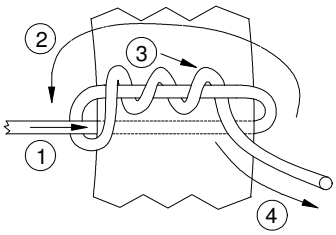
1/2" diameter by 5/8" deep, drill with Forstner bit.



String lock at tuner post:

1. Feed string through forward angled tuner hole.
2. Wrap loose end of string around toward the nut..
3. Feed loose end under the string and...
4. pull upward.
5. Apply tension to string to hold loose end in place while winding string to pitch.

Attaching strings at tailpiece:



1. Feed through tailpiece hole
2. Pass under front of string
3. Wrap 3 times around top loop
4. Pull ends to tighten knot

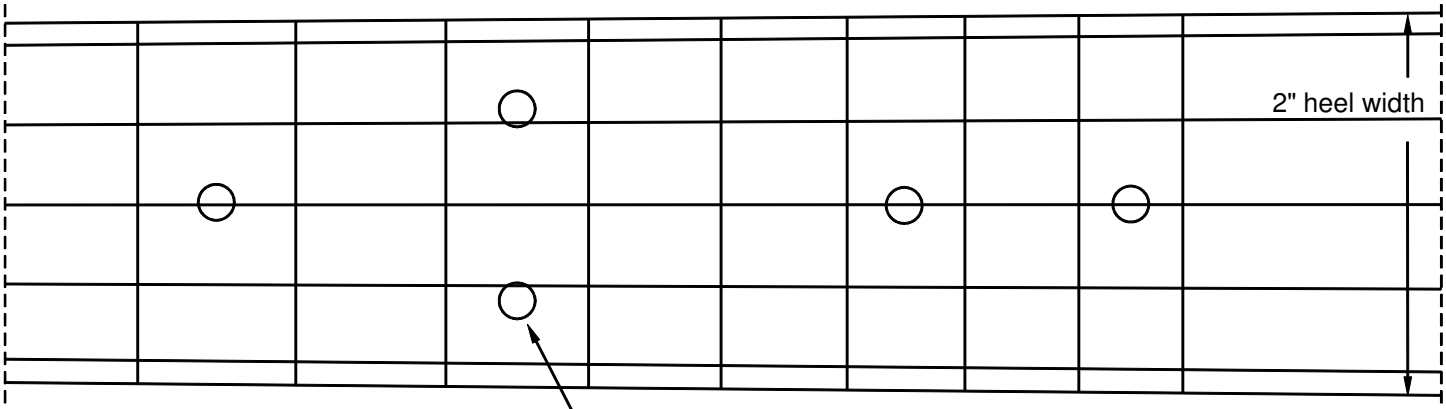
Measurement of fret position distances:

My tape measure looks like this, how do I measure to a 64th inch?

Split the distance between the 16th inch divisions for 32nd inch measurements, example 1-13/32"

Split the "visualized" distance again for 64th inch measurements, example 1-25/64"

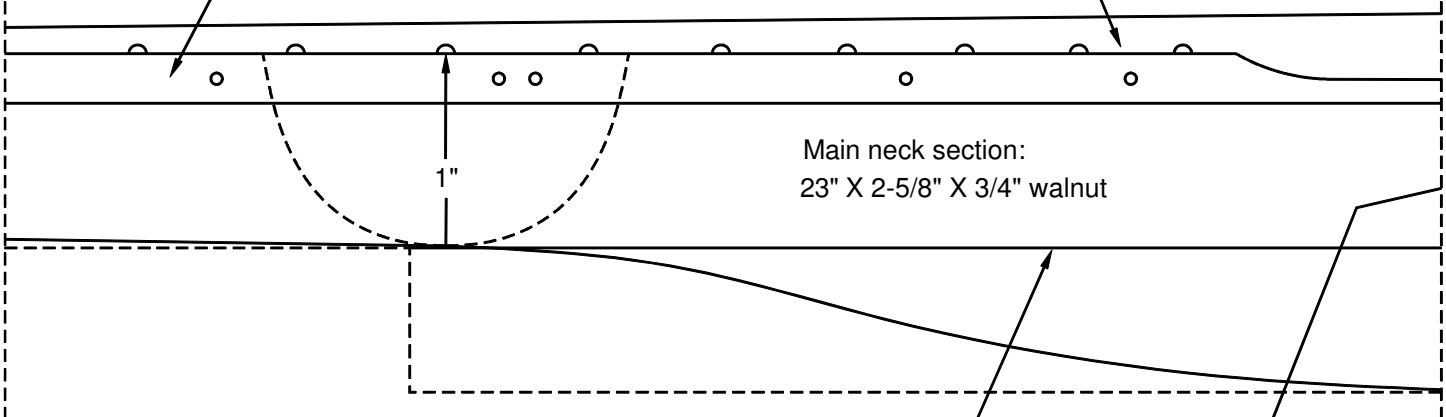
24-3/4" Scale Length Fret distances from zero fret:			
1.	1-25/64"	10.	10-55/64"
2.	2-45/64"	11.	11-41/64"
3.	3-15/16"	12.	12-3/8"
4.	5-7/64"	13.	13-1/16"
5.	6-13/64"	14.	13-23/32"
6.	7-1/4"	15.	14-11/32"
7.	8-15/64"	16.	14-59/64"
8.	9-5/32"	17.	15-31/64"
9.	10-1/32"		



3/16" dowel rod position markers
(commercially available pearl dots can also be used)

17-5/8" by 2-3/8" by 1/4" walnut fret board
(rough size to accomodate the bump out area at frets 4 / 5)

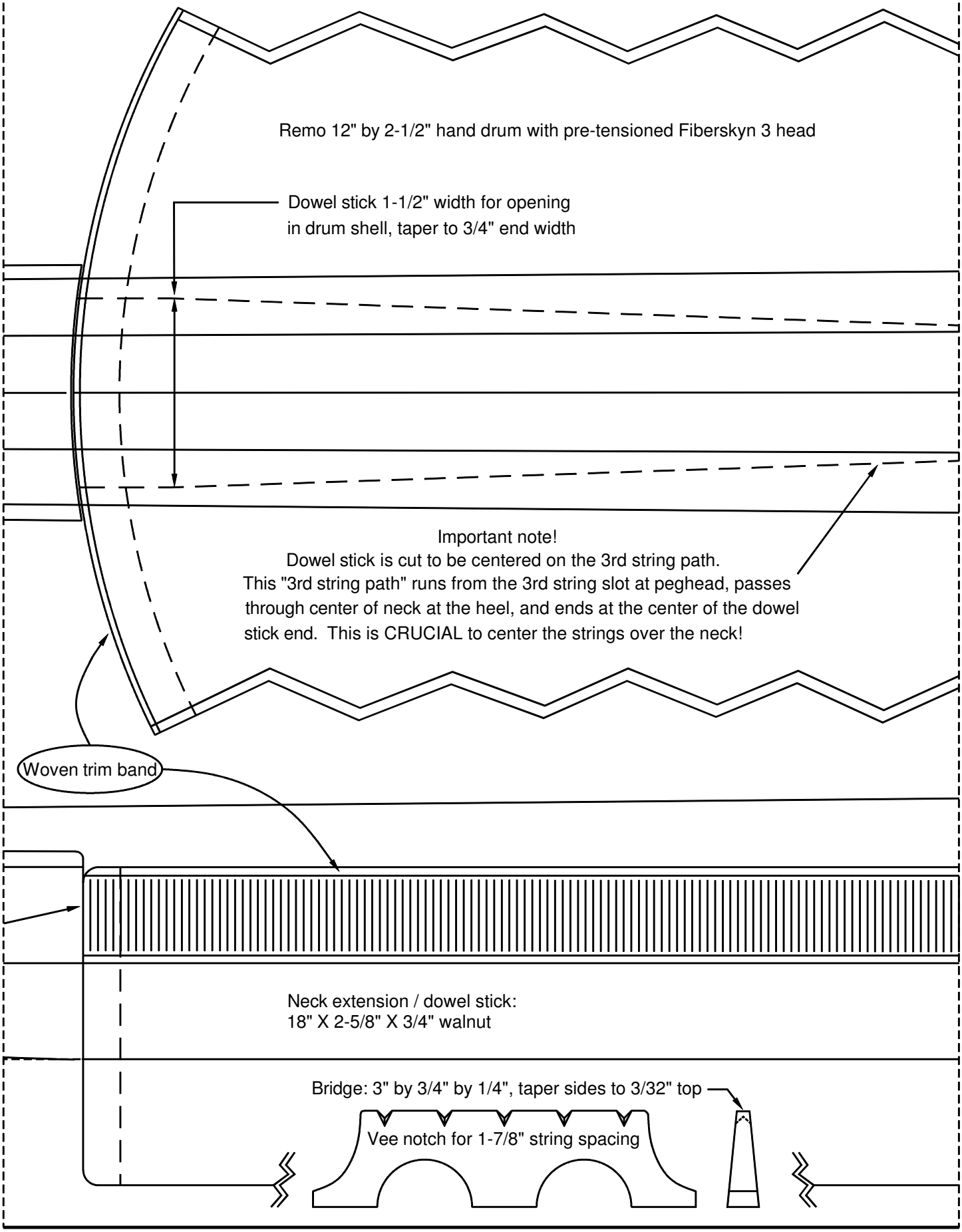
1/16" white plastic rod side markers

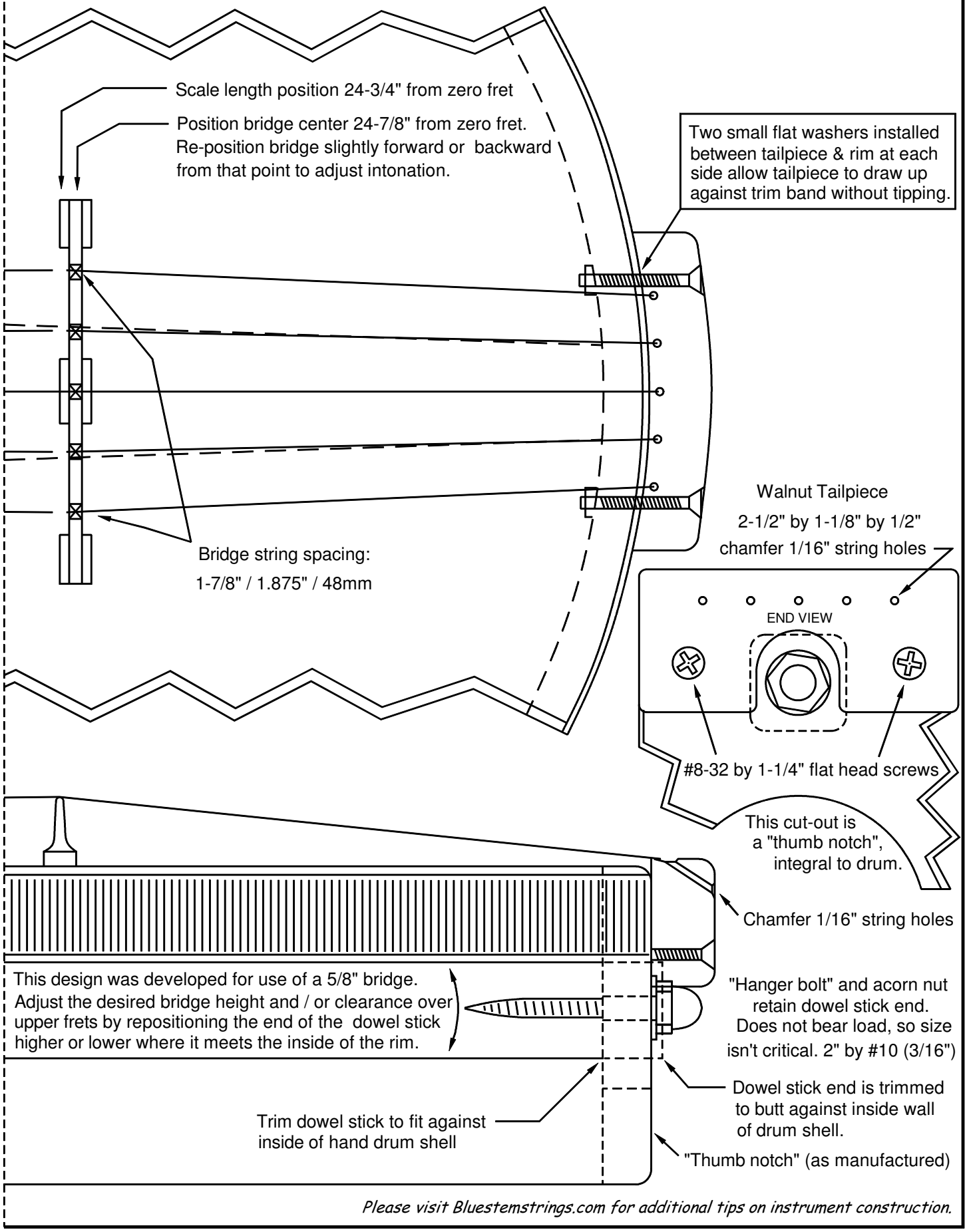


Main neck section:
23" X 2-5/8" X 3/4" walnut

All 3 neck sections glued together with 30 minute clear epoxy (cure 24 hours).
Fret board is added to top section before cutting neck profiles and shaping.

Note: Cut 6" radius (to match drum shape) at end of top board BEFORE gluing the sections together. (It's easier...)


Remo 12" by 2-1/2" hand drum with pre-tensioned Fiberskyn 3 head
Dowel stick 1-1/2" width for opening
in drum shell, taper to 3/4" end width
Important note!
Dowel stick is cut to be centered on the 3rd string path.
This "3rd string path" runs from the 3rd string slot at peghead, passes through center of neck at the heel, and ends at the center of the dowel stick end. This is CRUCIAL to center the strings over the neck!
Woven trim band
Neck extension / dowel stick:
18" X 2-5/8" X 3/4" walnut
Bridge: 3" by 3/4" by 1/4", taper sides to 3/32" top
Vee notch for 1-7/8" string spacing

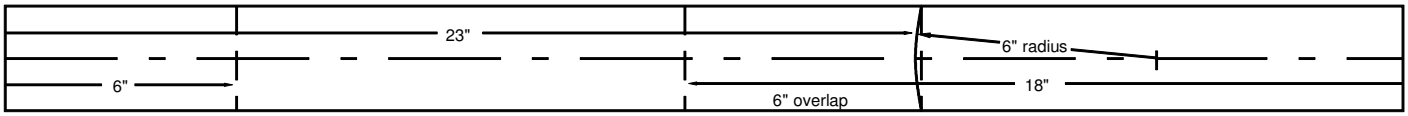


Please visit Bluestemstrings.com for additional tips on instrument construction.

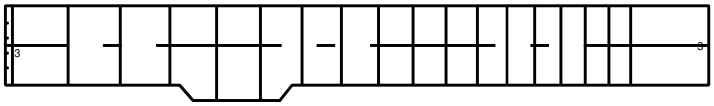
Bluestem Hand Drum Banjo Neck Layout

NOTE: See construction drawing for additional details.

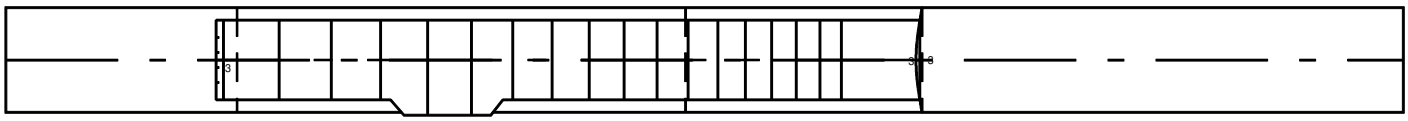
1. All 3 sections of neck are glued up. The 23" top section has a 6" radius pre-formed at its end prior to glue up.



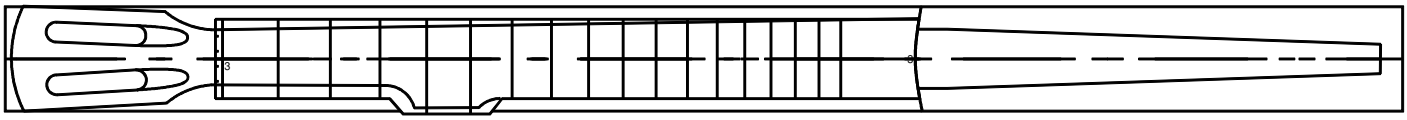
2. The 17-5/8" by 2-3/8" (at 4th / 5th fret) by 1/4" fret board is made next. String centers are marked at the nut end.



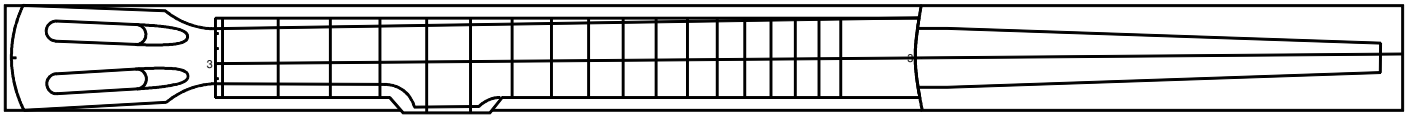
3. Fret board is glued on, centered on the blank.



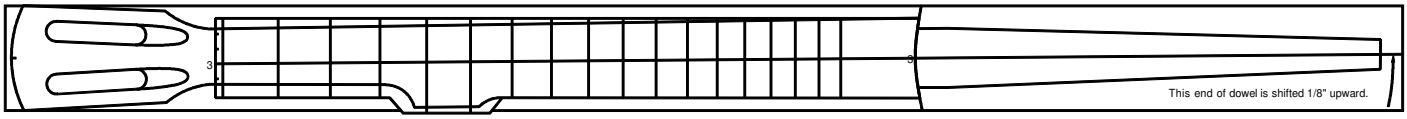
4. The neck profile is transferred to the neck and fret board blank.



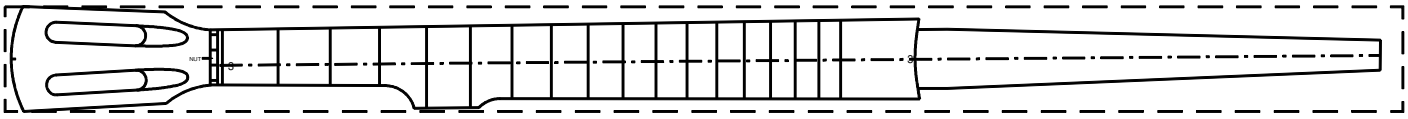
5. A new "centerline" is drawn from the 3rd string peg head end and extended through the center of the heel to the end of the neck blank.



6. The dowel stick extension is re-drawn to match this new centerline.
   This is done so the 3rd string path will coincide with the instrument's true centerline when mounted to rim.



7. The entire neck / dowel stick profile is now formed.

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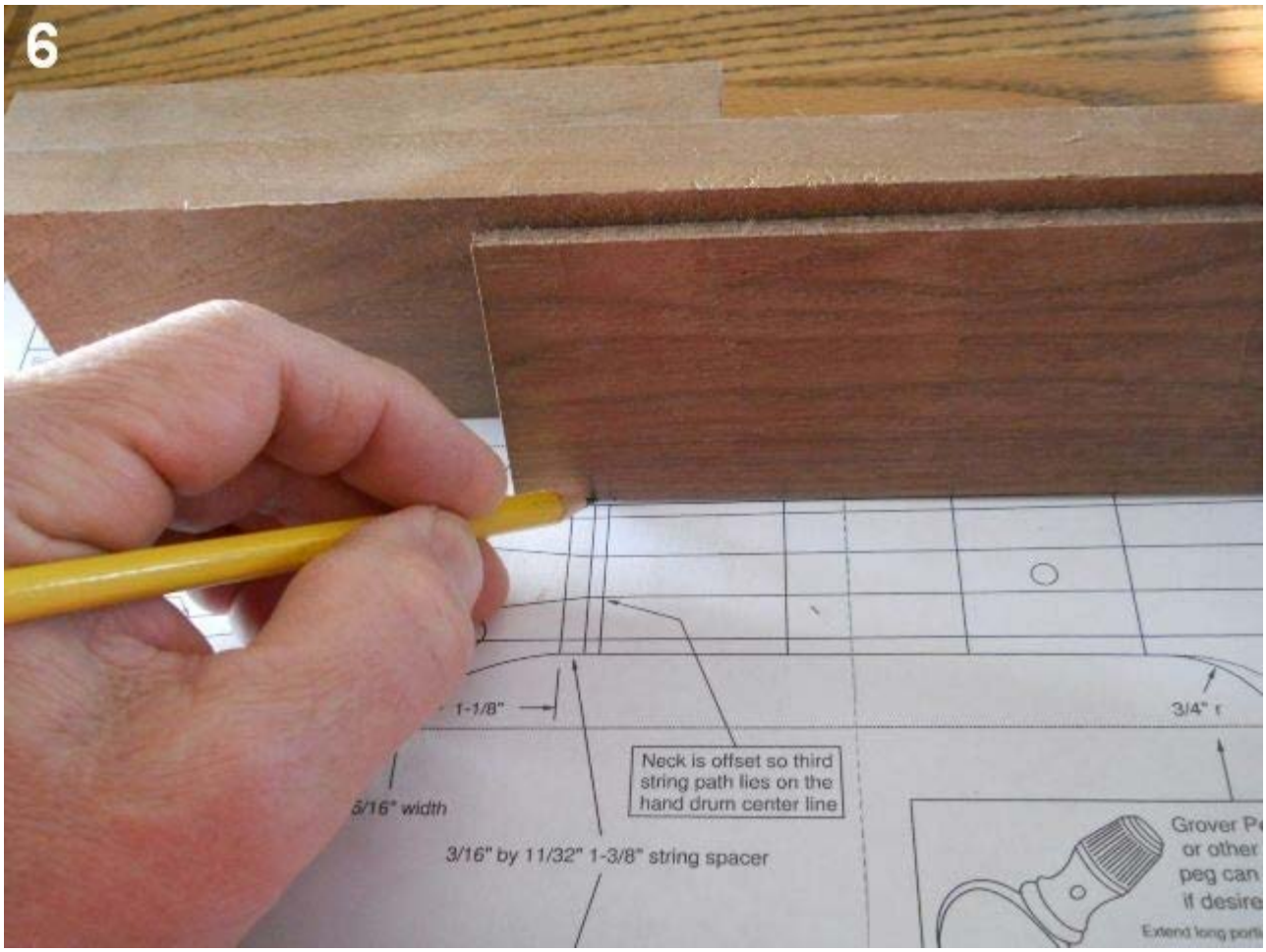
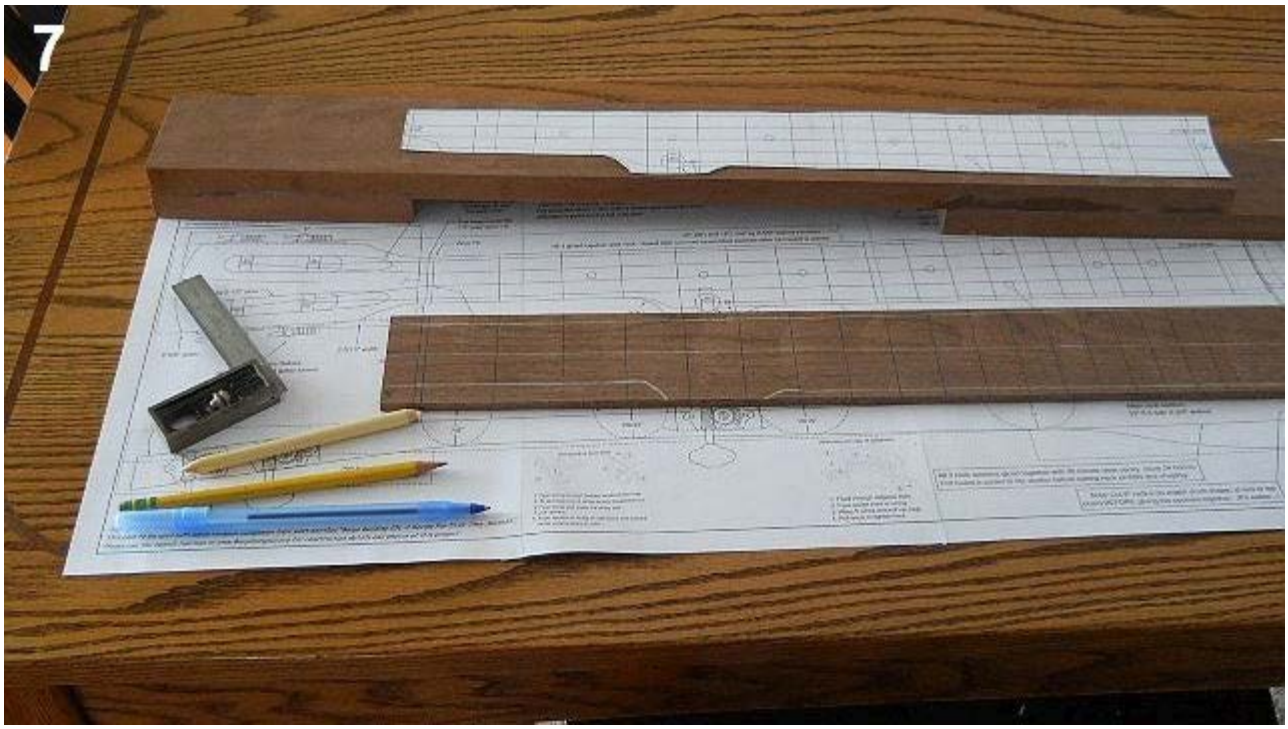

6
1-1/8"
3/4" r
Neck is offset so third string path lies on the hand drum center line
3/16" width
3/16" by 11/32" 1-3/8" string spacer
Grover P
or other
peg can
if desire
Extend long ports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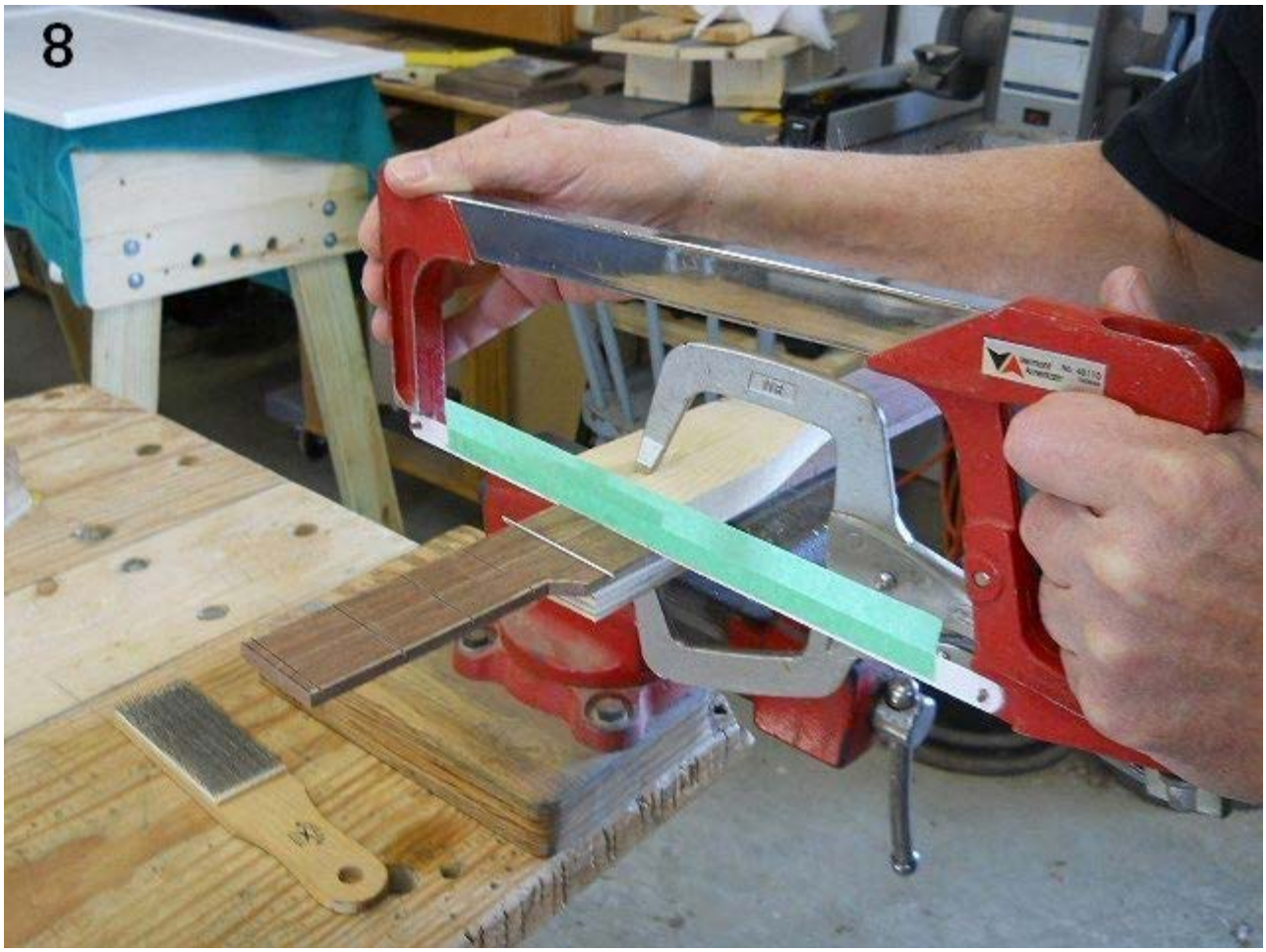
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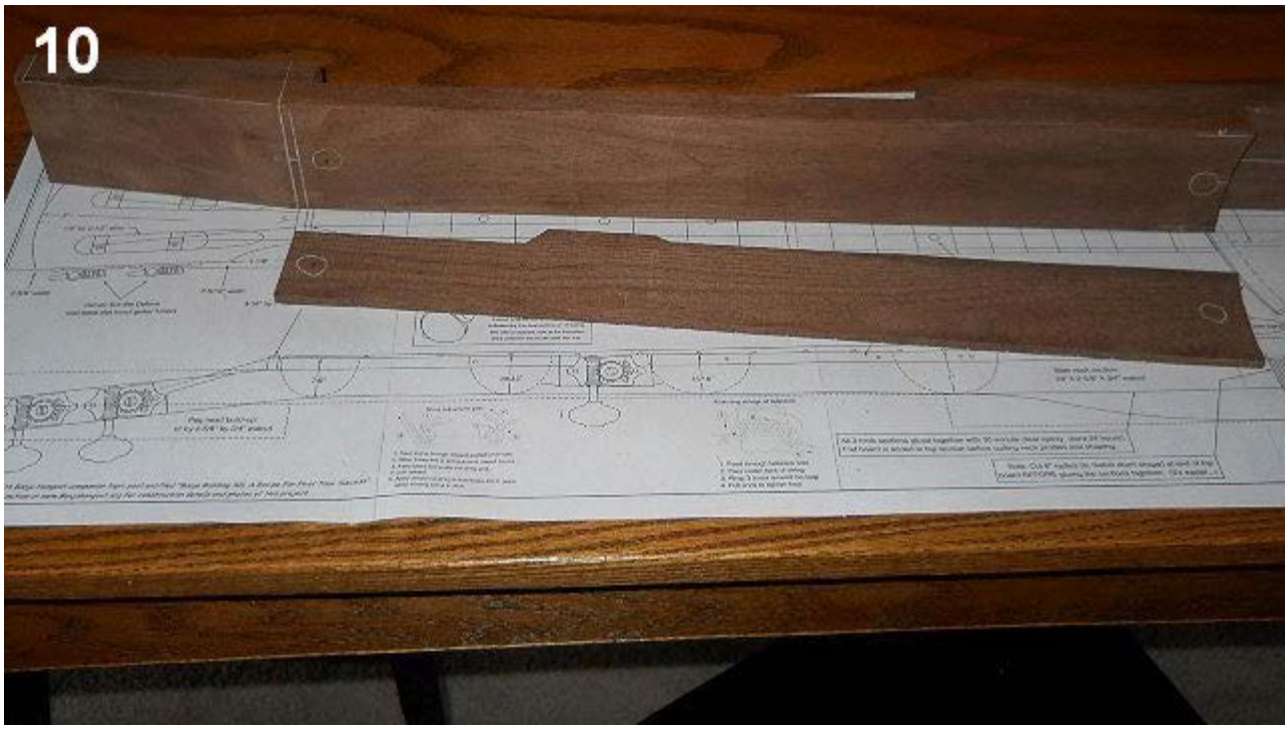
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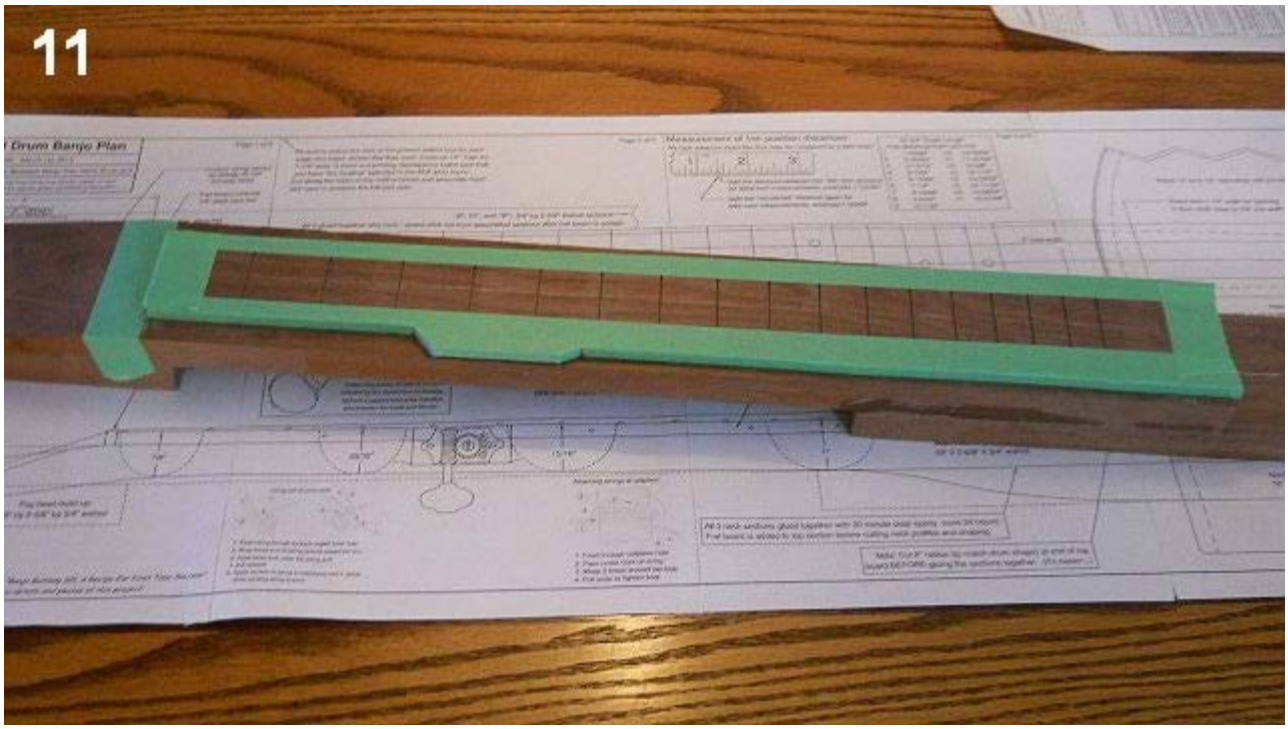
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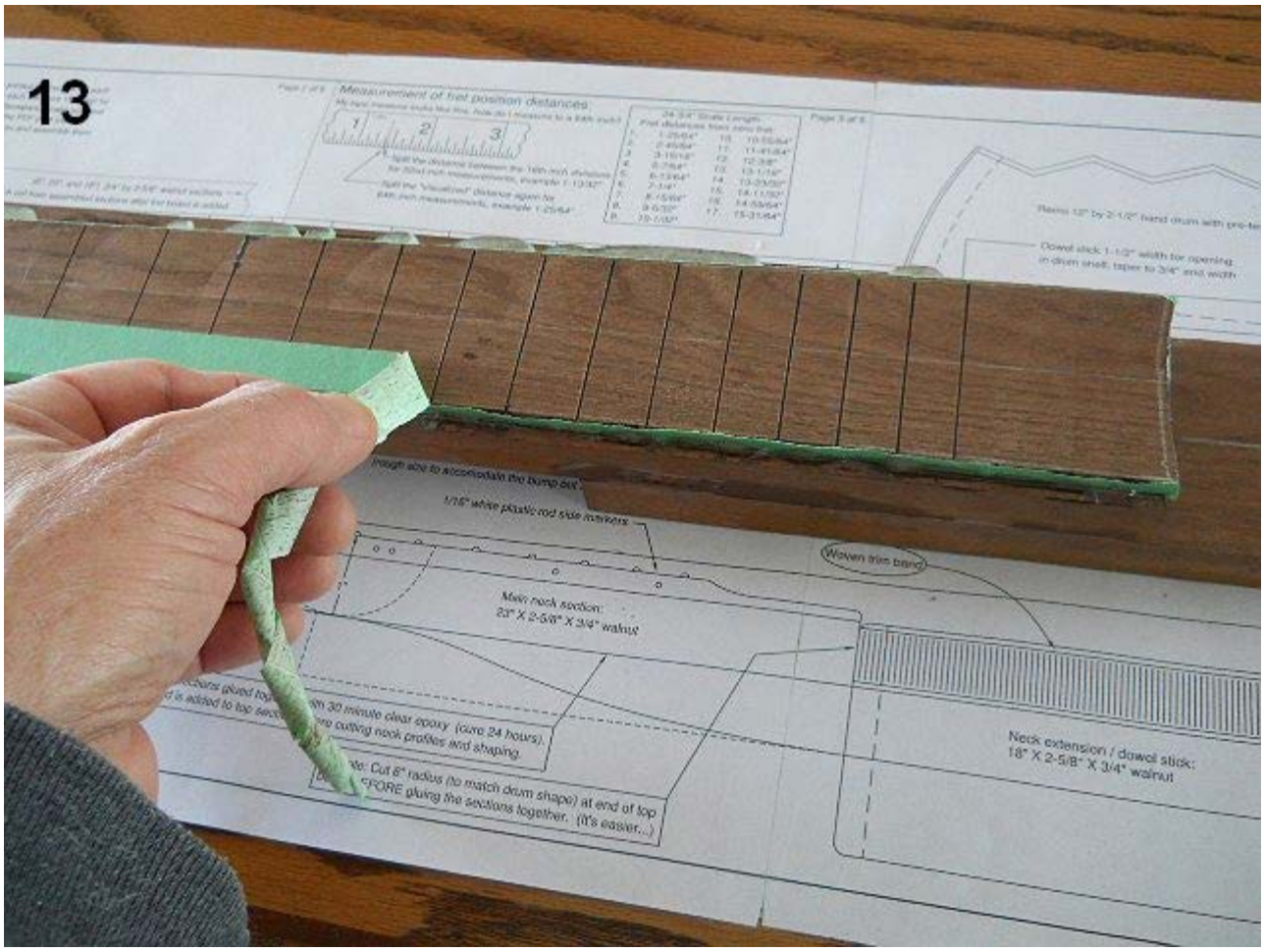
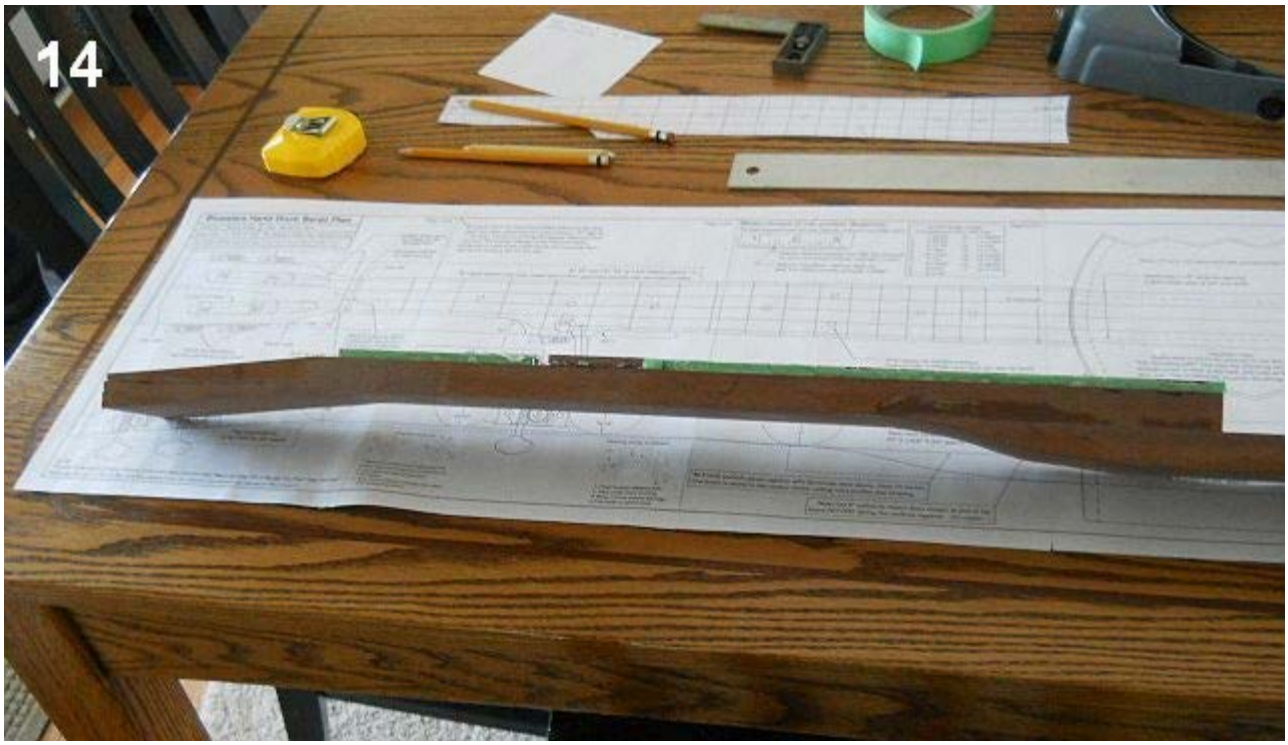

13
Measurement of fret position distances
Main neck section:
23" X 2-5/8" X 3/4" walnut
1/16" white plastic rod side markers
Woven trim band
Neck extension / dowel stick:
18" X 2-5/8" X 3/4" walnut


14

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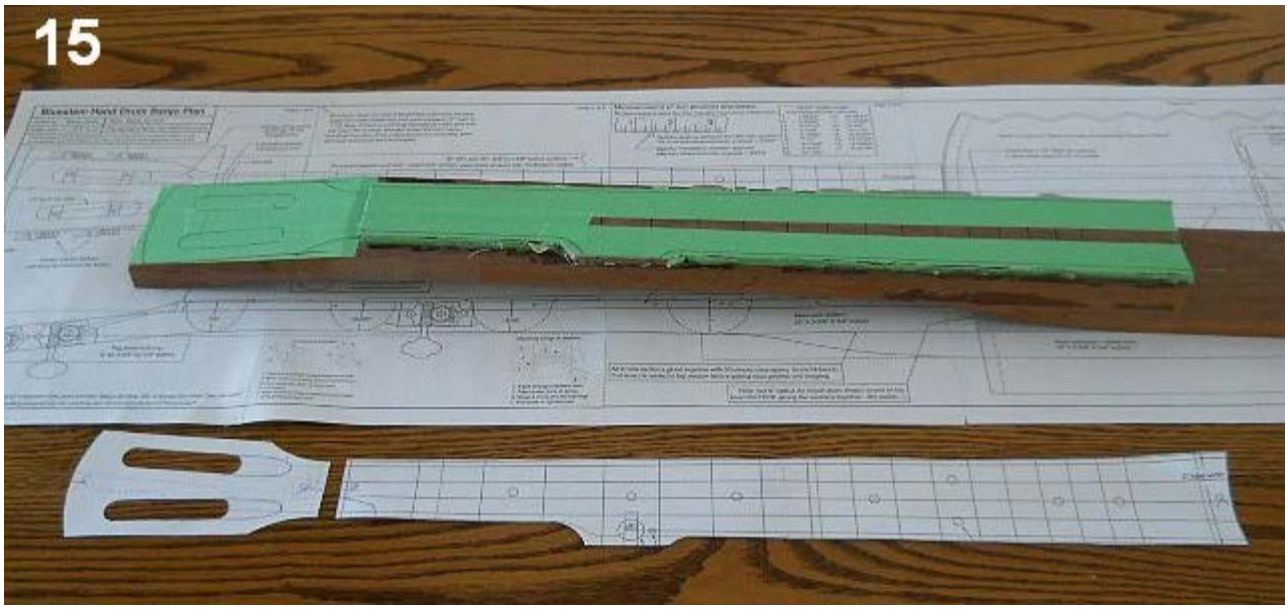
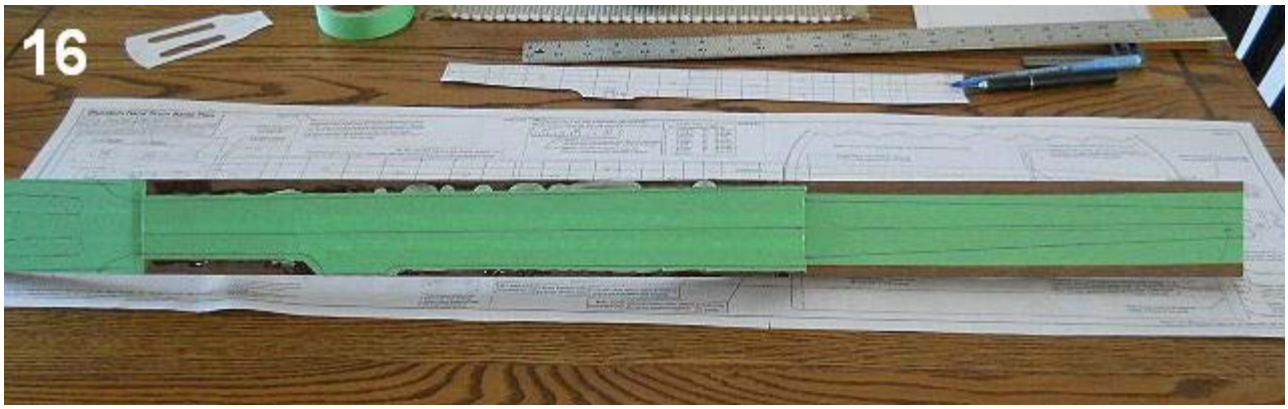
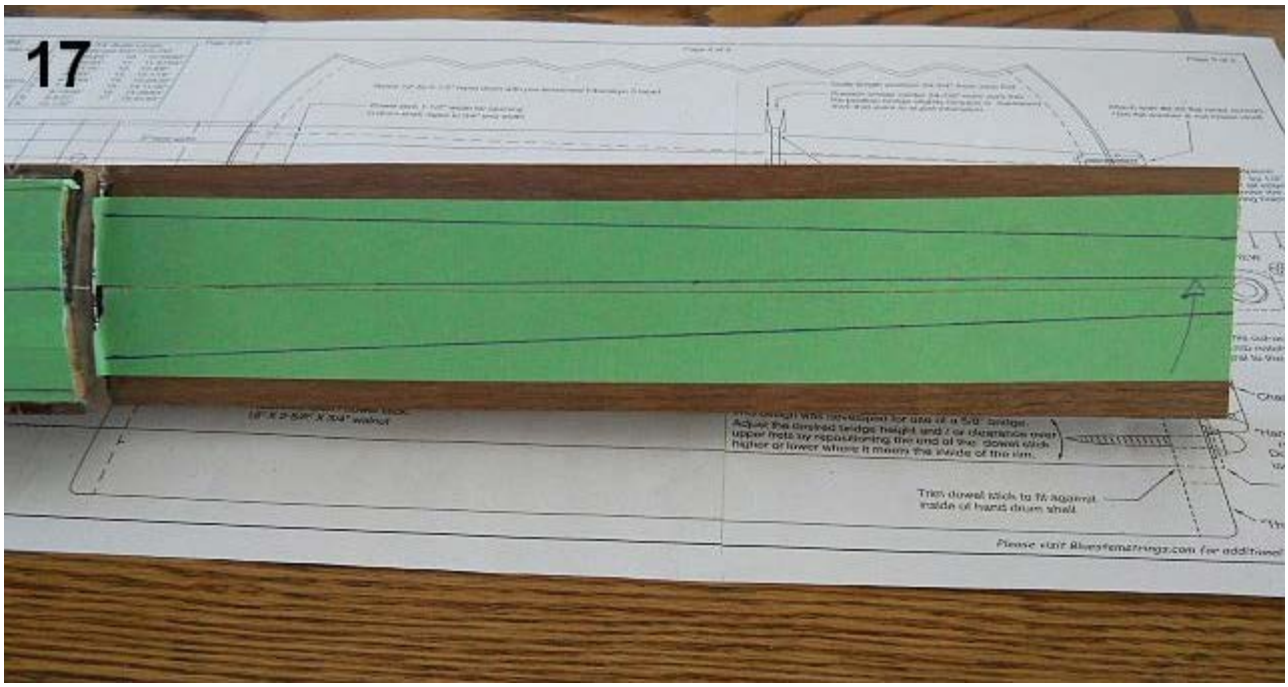
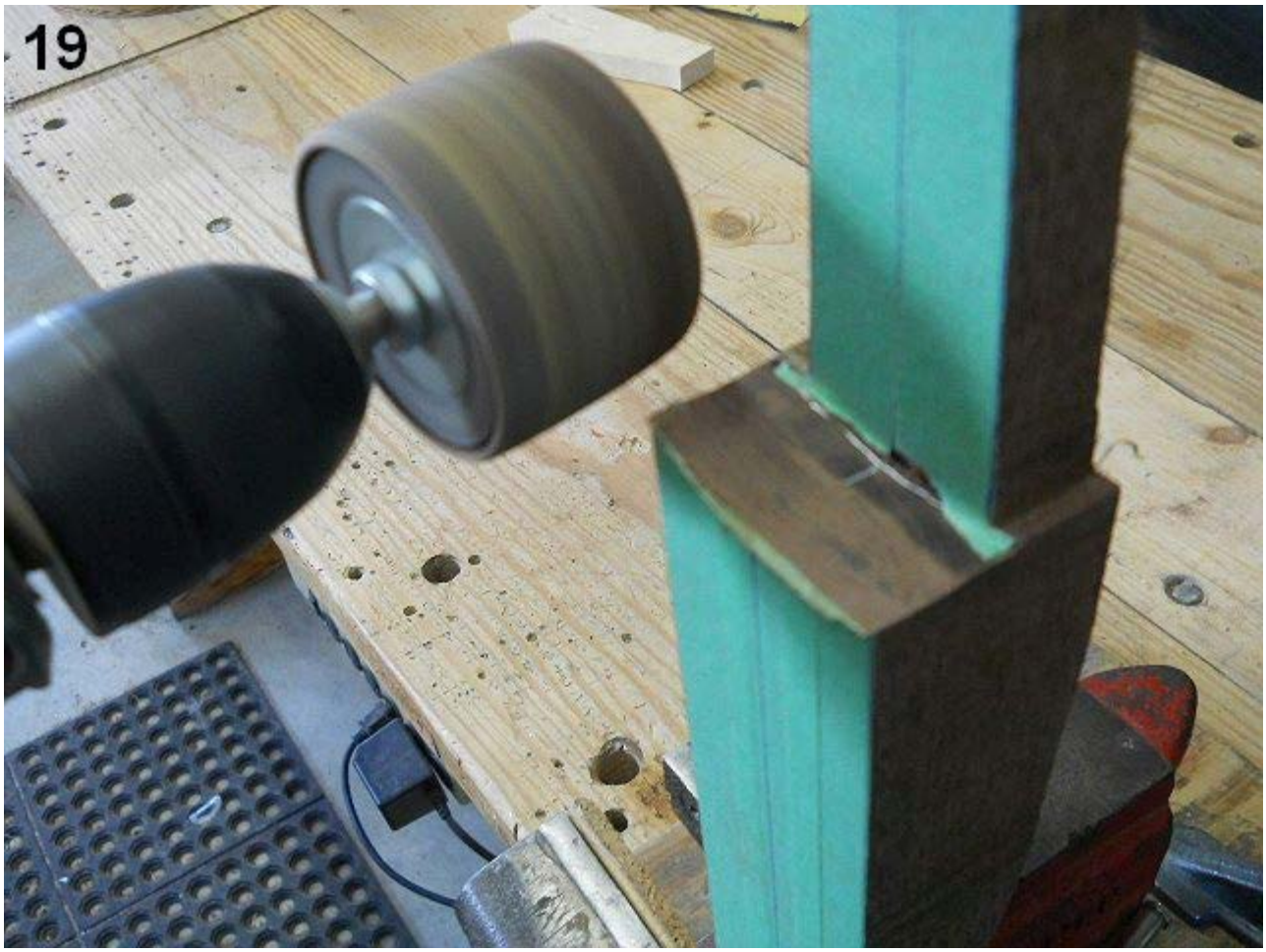



16


17
Trim dowel stick to fit against inside of hand drum shell


18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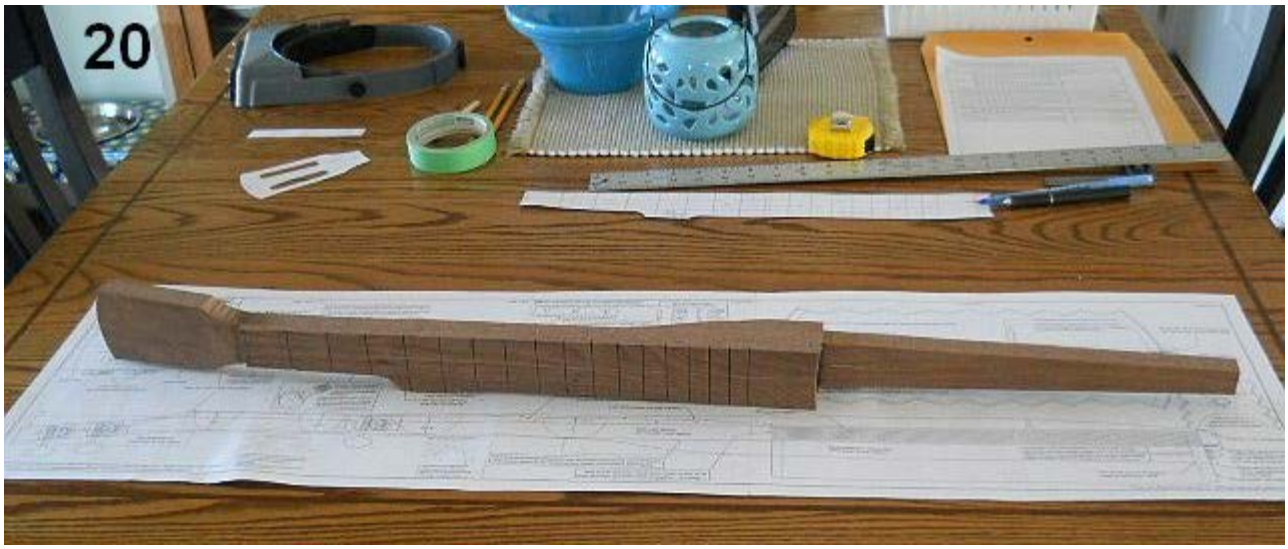
20

rudy

Rudy
United States
7342 posts since 3/27/04

3/11/2015 8:23 PM

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Day 4 - Final neck shaping

21. I most often shape my necks using four basic steps, as shown in attached photo #21.

1. Cut along the neck at a 10 or 15 degree angle close to the fret board edge to remove waste.
2. Cut along the neck at a 45 degree angle to within 3/8” of the neck center line.
3. Blend these refine these angled cuts into a fair curve using a coarse cut micro-plane rasp.
4. Form transition areas and do any final shaping using 220 grit paper on a 5” random orbit sander.

22. The fret board edge is very difficult to see, so a line is drawn on both sides to make the line where they are joined easier to see. (Yes, that’s a pretty good glue joint!) The large X reminds me to NOT angle cut that area, as it needs to be a full 3/4” wide to mount the 5th string tuner.

23. The band saw table angle is set to 10 degrees and the waste is cut from each side. The cut is made just above the glue line between the fret board and neck blank, that’s why the contrasting white line was drawn. One of the reasons why this step is done is so there is very little extra material to be sanded smooth when we clean up the fret board edges as shown a bit later in photo #26.

24. The table is re-set to 45 degrees and additional waste is trimmed. Since this neck is generally thinner and fairs to a flat heel area the cut follows a line drawn about 1/2” above the fret board edge, flaring out as the blade reaches the “heel” area of the neck.

25. Both sides of the peg head and the flat portion along the side of the neck at the 5th string bump-out are sanded to produce a finished edge and to make sure that the edges are 90 degrees to the peg head face and fret board edge so the tuners can be mounted correctly.

26. Both edges of the fret board are now sanded to remove the remaining band saw blade marks. A small sanding drum was used to smooth the transition areas at both ends of the 5th string bump out. I’m using a sanding block that has a permanently bonded silicon carbide surface, but most often I use scraps of plywood with coarse sandpaper stuck on with heavy duty double sided carpet tape, “the luthier’s friend”.

27. The neck to peg head transition is formed with the 2” 50 grit sanding drum held in a portable drill.


21


22


23


24


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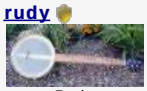
26


27

rudy



Rudy
United States
7342 posts since
3/27/04

3/11/2015 8:25 PM

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Day 4 continued - Final neck shaping, continued

28. The shape of the 5th string tuner bump out can be shaped using the sanding drum. Make sure that the flat area is left a full 3/4" wide to mount the tuner plate.

29. The heel area is shaped to blend the flat area at the rear of the heel into the more rounded shape of the neck shaft. Notice in the photo that the neck is ALWAYS cushioned by cork-padded clamping cauls whenever it is clamped down. The fret board surface is cushioned by a cork-padded caul in these photos.

30. I prefer to refine the heel areas by holding the neck in my machinist's vise. (Yes, those are cork-faced cauls in the vise!)

31. The heel is further refined using the 2" 50 grit sanding drum.

32. All of the final refining of the neck and transitional areas is done with the random orbit sander fitted with a 220 grit disk. I control the sander with a momentary foot switch. It's not absolutely necessary, but I HIGHLY recommend getting yourself one of these. It has absolutely made sanding enjoyable for me. (Well, if you ever can truly consider sanding enjoyable...)

33. The entire neck can be sanded at this time. The dowel stick can also have it's corners rounded a bit in the sanding process, but be sure to leave the corners of the dowel stick just behind the neck heel sharp. The dowel stick needs to fit tightly in the opening that will be cut in the rim to fit the neck to the hand drum.


28


29


30


31


32


33

kaybone

Mark Kerecman
Highland Heights, OH
United States
869 posts since
6/6/11
Online

3/12/2015 9:18 AM

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It's very easy to take this entire thread when done and turn it into one easy .pdf file to download, using Adobe Acrobat. After having done many build projects on my Jeep, I get the convenience of having all the info in one easy place that could be printed off. Here's an example of the thread so far in a .pdf (pics and diagrams will basically end up at the end. I hope this is helpful. The beauty of it is it embeds the diagrams and pictures into the .pdf without ever having to worry that picture links on servers will go away, which they mostly always do :

banjo build test file

Edited by - kaybone on 3/12/2015 9:22 AM

rudy

Rudy
United States
7342 posts since
3/27/04

3/12/2015 9:36 AM

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> quote:
>
> *Originally posted by kaybone*
> It's very easy to take this entire thread when done and turn it into one easy .pdf file to download, using Adobe Acrobat. After having done many build projects on my Jeep, I get the convenience of having all the info in one easy place that could be printed off. Here's an example of the thread so far in a .pdf (pics and diagrams will basically end up at the end. I hope this is helpful. The beauty of it is it embeds the diagrams and pictures into the .pdf without ever having to worry that picture links on servers will go away, which they mostly always do :

Hi Mark, Thanks for the comments.

I checked the test link, but the problem that I see in that example is all of the photo and pdf links come right back to the BHO server, and I believe that's what some have said is the problematic part of the process. If that's how the pdf is done then it ends up not being a easily distributable file that is "self-contained".

kaybone

Mark Kerecman
Highland Heights, OH
United States
869 posts since 6/6/11
Online

3/12/2015 10:18 AM

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quote:

Originally posted by rudy

quote:

Originally posted by kaybone
It's very easy to take this entire thread when done and turn it into one easy .pdf file to download, using Adobe Acrobat. After having done many build projects on my Jeep, I get the convenience of having all the info in one easy place that could be printed off. Here's an example of the thread so far in a .pdf (pics and diagrams will basically end up at the end. I hope this is helpful. The beauty of it is it embeds the diagrams and pictures into the .pdf without ever having to worry that picture links on servers will go away, which they mostly always do :

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Actually, they ARE self-contained. Do this to test. Download the .pdf I just posted, then turn off your internet connection (no servers involved now). When you open the .pdf and click on one of the small icons contained in the new pdf file, it will link you to the jpgs now at the end of the document. Should work fine. Does at my computer when I tested it like that.

And BTW, Thanks for this build project! this is awesome!

Edited by - kaybone on 3/12/2015 10:23 AM

rudy

Rudy
United States
7342 posts since 3/27/04

3/12/2015 12:22 PM

Like Report to Moderator

Mark, That does indeed do the trick so that's a definite option. It does incorporate BHO's forum structure, and I'm not at liberty to incorporate that portion, but that doesn't prevent anyone else from archiving the topic in that way.

kaybone

Mark Kerecman
Highland Heights, OH
United States
869 posts since 6/6/11
Online

3/12/2015 2:30 PM

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quote:

Originally posted by rudy
Mark, That does indeed do the trick so that's a definite option. It does incorporate BHO's forum structure, and I'm not at liberty to incorporate that portion, but that doesn't prevent anyone else from archiving the topic in that way.

Great! I'll be happy to do that to this entire thread when it becomes complete so new banjo builders can print off the .pdf to have it next to them as they go. Can't see there is any copyright or usage issues since you are the owner and creator of all of the information.

Now I have two questions for you. One, since this build is with a pre tensioned head. Is there anyway to tighten that head up after it is built ? You know how banjo heads can be after a while in the weather, they can get a little floppy. And second, my concern starting a project like this since it would be my first build is getting all of the printed pages aligned properly so the fret spacing is exact for intonation. Any suggestions for getting that all lined up properly once the diagrams are printed off?

Edited by - kaybone on 3/12/2015 2:30 PM

BackDraft307

3/12/2015 3:19 PM

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quote:

Jeff
Midland, MI
United States
186 posts since
1/6/08

Originally posted by kaybone

quote:

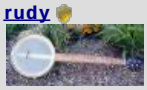
Originally posted by rudy
Mark, That does indeed do the trick so that's a definite option. It does incorporate BHO's forum structure, and I'm not at liberty to incorporate that portion, but that doesn't prevent anyone else from archiving the topic in that way.

Great! I'll be happy to do that to this entire thread when it becomes complete so new banjo builders can print off the .pdf to have it next to them as they go. Can't see there is any copyright or usage issues since you are the owner and creator of all of the information.

Now I have two questions for you. One, since this build is with a pre tensioned head. Is there anyway to tighten that head up after it is built ? You know how banjo heads can be after a while in the weather, they can get a little floppy. And second, my concern starting a project like this since it would be my first build is getting all of the printed pages aligned properly so the fret spacing is exact for intonation. Any suggestions for getting that all lined up properly once the diagrams are printed off?

Thanks Mark.... That's what I was thinking of with the PDF... except the entire forms added. I do like that idea, This way all follow up questions can be seen and answered..

rudy



Rudy
United States
7342 posts since
3/27/04

3/12/2015 4:45 PM Like Report to Moderator

quote:

Originally posted by kaybone

quote:

Originally posted by rudy
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Thanks, Mark. From my end that would be fine. The only copyright or usage issues would have to do with Eric and incorporating the actual forum structure. I wouldn't think he would have any problem with that, but I can't speak for him.

Questions are good! (having answers even better...)

As far as the head tensioning, it's not an issue. Remo uses Fiberskyn 3 material that is permanently bonded to a shell material they label as "Accousticon". The head to shell bond is really well done and neither material is effected by hot or cold (within reasonable limits of course) or moisture. One of these guys went to a forum member that uses it for heavy-duty backpacking trips and he relayed that it's been a trouper for him.

Regarding page printing, if the instructions presented on page one are followed there won't be any problem with fret placement. Notice that the plan places the majority of the frets on two pages so their relationships won't be effected with the printing; that was purposefully done. The split between the lower frets is less critical (placement again by design) and the most critical split between pages 2 and 3 will be no problem if the lines are trimmed as suggested. After the print is assembled the best check is a distance measurement from the zero fret line to the 12th fret. If this measurement matches the distance shown on the chart you're golden.

In actuality you'd have to do something like assemble a page upside down to make enough of a difference to effect intonation noticeably!

The fret positions could also be measured or even directly printed from wFret (download link available from my website for PC users), although this is unnecessary. Everything you need is right here!

This build is so forgiving that even if the printed size were off a bit that the relationships would still be the same and produce a totally acceptable instrument.

rudy

3/12/2015 8:15 PM Like Report to Moderator

Rudy
United States
7342 posts since
3/27/04

Day 5 - Installing position markers and side dots

34. Check top surface to verify that it is flat. It should be, but if there was any movement in the neck blank as a result of cutting the profile or sanding this is the time to correct it. If the wood was initially stable and dry it should be fine. A small amount of concave bow is acceptable, but if it is excessive or there is any convex bow it will be necessary to sand the top surface flat before fretting. The slots should be deep enough to allow a small amount of correction, but do check them if sanding was done to flatten the top surface. The slots can always be deepened a bit if the fret crown doesn't contact the board surface.

35. The position marker locations are marked on the fret board surface and a 3/16" brad point drill is used to create a 1/4" deep blind hole to glue in a length of contrasting wood dowel. You could substitute pearl if you like, but I won't outline its use here. Remember, we're going for simple.

36. The dowel sections used for markers are cut off a bit higher than the fret board surface and the fret board is sanded lightly using a small belt / disc combination sander to level the dowel sections to the board surface.

37. Drill 1/4" deep blind holes with a 1/16" bit along the edge of the fret board and glue in 1/16" diameter side dot material using a little Titebond in the hole. The marker rod is bent to the side and trimmed slightly above the hole with a #11 blade.

38. The side dots are sanded flush with the surface using 220 grit sandpaper.

39. The end of the board can have a scoop formed at the end if desired. Remove about half the thickness of the fret board and use the 2" sanding drum held in the portable drill to blend the flat area up to the board surface. Make sure that the scoop remains at least 1/4" from the last fret slot.


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Edited by - rudy on 3/12/2015 8:16 PM

kaybone

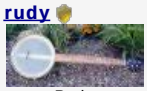
Mark Kerecman
Highland Heights, OH
United States
869 posts since
6/6/11
Online

3/12/2015 8:23 PM

Like Report to Moderator

Thanks for answering my questions Rudy, NP if there is an issue not being allowed to incorporating the "forum structure" into the .pdf. I can just copy the text parts of the posts, and do it that way, however, that's a bit more work, but certainly doable. looking forward to the rest of the build.

rudy



Rudy
United States
7342 posts since
3/27/04

3/13/2015 10:08 PM

Like Report to Moderator

Day 6 - Drilling holes for the string posts

40. Two 6" lengths of scrap board are cut and glued together to serve as a right angle guide for producing the drilling jig hole we will use for drilling the actual tuner string post holes. Taking the time to make the drilling jig will eliminate all chance of having a "OOPS!" moment when drilling for the tuners. You really don't want that, do you? Hang with me, we'll get there!

41. The 17/64" drill bit is used with the guide to produce a centered hole on 3/4" thick scrap.

42. The hole should allow the tuner to be inserted with the tuner body centered on the block. It should fit identically from the opposite side. Make certain it fits from both sides to make sure the hole was drilled correctly.

43. A copy of page 1 of the plan can be used to produce a guide to locate the tuner string post holes on the sides of the peg head.

44. Transfer the tuner string shaft centers directly to the peg head sides with a sharp point.

45. The tuner string post locations can be transferred to the opposite side of the peg head from the rear of the pattern.

46. The guide block is first glued to a scrap of plywood and is clamped to the peg head face to use as a guide for drilling the 17/64" tuner string post holes. The drill bit shank is marked with tape to limit the drilled hole to a 1-1/8" depth. You can now see how the guide block ensures a perfectly centered string post hole drilled to the proper depth. Your drilled holes may meet when drilling from the opposite side. That's OK, no problem.

47. The holes are chamfered slightly to allow clearance for the small washer at the back surface of the tuner plate.

48. The hole for the fifth string tuner is drilled identically to the holes drilled for the tuners at the peg head.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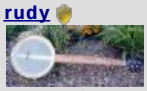
48

rudy



Rudy
United States
7342 posts since
3/27/04

3/14/2015 9:20 PM

Like Report to Moderator

Day 7 - Slotting the peg head

49. The 1/2" holes that define the string slots are drilled on 5/8" centers from the edges with a Forstner bit, but are stopped just short of breaking through the rear face of the peg head. It's easier to clamp the peg head against a scrap of wood on the bench and drill all the way through, but I'm drilling from both sides for demonstration purposes. The 5/8" from outer edge to center of hole distance gives us a nice 3/8" outer band to add the tuner mounting screws.

50. The holes are completed by drilling from the rear. centering the tip of the Forstner bit on the tiny divot created when drilling from the front side.

51. The area that will be cut between the sets of holes is defined with a sharp #11 blade on the front and rear faces of the peg head. This will minimise the possibility of splintering the edge when it is sawn.

52. A wood blade in the jig saw is used to remove the waste area of the openings. I have a Porter-Cable jig saw, but I'm using my $20 special to demonstrate that marginal tools can produce acceptable results. A good blade and skilled operator will trump an expensive tool every time.

53. The 1/2" diameter access hole for the 5th string tuner post is drilled 5/8" deep with the Forstner bit.

54. The string ramps are carved out and refined with 80 grit sandpaper wrapped around a section of 3/8" dowel rod. Protect the edge of the fret board from damage with tape, the farther along you are in any project means that you must exercise more care in not turning your efforts to scrap.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Yanni

Ian
Morecambe, United Kingdom
180 posts since 7/4/13

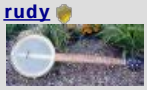
3/16/2015 2:16 PM

Like Report to Moderator

This is fabulous Randy, I'm really enjoying it :) Thankyou so much for all the work you have put into this and everything at Bluestem!

Ian

rudy



Rudy
United States
7342 posts since 3/27/04

3/16/2015 10:27 PM

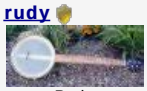
Like Report to Moderator

> quote:
>
> *Originally posted by Yanni*
> This is fabulous Randy, I'm really enjoying it :) Thankyou so much for all the work you have put into this and everything at Bluestem!
>
> Ian

Hi Ian,

I'm happy that anyone is following it. It's obviously targeted to the new builder, but I think there's still some useful information for many folks. Glad to be of assistance!

rudy



Rudy
United States
7342 posts since 3/27/04

3/16/2015 10:30 PM

Like Report to Moderator

Day 8 - Fret installation

55. Double-check the slot depth using the chosen size of fret wire and saw a bit deeper if necessary.

56. Four feet of fret wire will do the job; Stewart MacDonald #148 medium guitar wire has been picked out for this banjo.

57. Pre-cut all the pieces about a 1/4" wider than required. It helps to make a simple fret stand to keep them in order, sorting lengths really isn't any fun.

58. Mask each slot by placing a piece of fret wire in the slot and masking to the edge of the fret crown. This will allow the frets to be epoxied in place without getting epoxy where it's not wanted.

59. Mix up enough 30 minute clear epoxy and use a thin blade to pull the epoxy along the board, filling each slot in the process.

60. Drop each fret into its respective slot. After all the frets are in place it is easy to hold each fret in place with a fingertip (wear disposable gloves!) and wipe along the side to remove excess epoxy. It is easiest to do one side of the fret board and then turn the neck around and do the second side.

61. Invert the board over a flat and level surface that has been covered with a piece of disposable shelf liner and clamp the neck in place using cork padded cauls. Although the epoxy is designated as "30 minute" it was left here for 4 hours before removing and pulling all the masking tape off.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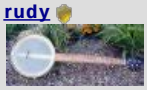
rudy



Rudy
United States
7342 posts since
3/27/04

3/17/2015 8:07 PM

Like Report to Moderator

Day 9 - Fret finishing

62. The top of the fret board can have the remaining bits of tape removed using a single edge razor blade.

63. The edge of the razor blade can be used to scrape along the edge of the fret to remove the residue.

64. The fret board is further cleaned with 0000 steel wool. The steel wool is used first across the board along the fret edges and then used along the length of the fret board to polish up the frets.

65. One method of trimming excess length from the ends of the frets, staying about 1/8" away from the edge of the board to prevent distorting the fret material and possibly loosening the fret end in the slot. "End Nippers" are traditionally recommended for this, but they can cause the same problems with distorting the fret material when they are used.

66. Another method that can be used is to sand the ends close to the fret board edge. The 80 grit sanding drum must be used in a direction that doesn't try to pull the fret out of the slot and care must be used to not overheat the fret or sand too close to the edge of the fret board. Tape is stretched over the fret ends if this method is used.

67. My (much preferred) method. The neck is clamped against the bench and a metal cut-off disk is used in a Dremel to angle cut the fret ends off. It's quick, easy, and leaves very little to finish off flush with the fret board edge with the file. The arrows point out three frets that are already trimmed.

(Day 9 - Fret finishing, continued nest post...)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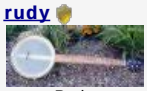
Edited by - rudy on 3/17/2015 8:16 PM

rudy



Rudy
United States
7342 posts since
3/27/04

3/17/2015 8:13 PM

Like Report to Moderator

Day 9 - Fret finishing, continued:

68. I use a single cut Nicholson "Handi-file" to bring the small bits of fret end down level to the edge of the fret board. I cut the tang off the file using a Dremel cut-off disk and rounded the end with my disk / belt sander. The frets are facing left and the file is only used in the direction shown. It's always a good idea to file in a way that pushes the frets into the slots rather than pulling them outward as they are filed.

69. The edges of the frets are filed to around 30 degrees. I like to file until the flat edge of the 30 degree angle flat mates up with the fret board edge.

70. Each fret end gets a single sweeping pass of the file to break the sharp corner off the fret. The file is held with the "FLAT" edge against the board so it will contact the lower edge of the fret.

The file used here is a "specialty file" with one smooth, "FLAT" side and the other "SAFE" side with a smooth, flat side and rounded corners. The side without the

rounded corners is used to file the sharp corner off the fret and the side with rounded edges is used to round the fret end slightly by using a rolling upward sweep. I have a YouTube video to demonstrate how to make this file and how to properly dress the fret ends, it can be found ***HERE***.

71. Each corner gets a rolling upward sweep to round the fret end slightly. This sounds like it might be time-consuming, but it takes only a minute or two to do both filing strokes on both sides of the fret board.

72. The file is followed by rounding and polishing the ends with 220 and 400 grit sandpaper.

73. The ends are further polished with 0000 steel wool.

74. I'm applying warmed beeswax to the fret board surface just to demonstrate what it will look like when completed, plus it will also make for a nicer feel when we test drive the assembled banjo. The heat gun is used to warm the wood just to the point where the wax rubs on easily; you'll be able to ascertain this easily as the wax starts to melt into the wood. Do the whole board and then follow up by heating the wax to the point where you can polish off the excess with a soft cotton cloth. This is really an enjoyable process; it smells great and leaves a finish that is absolutely perfect in every way. Another huge advantage is any further finish work later all blends together with no worry about previously applied layers of finish.

75. Since I waxed the fret board I'm also doing the back of the neck, as it's not a good idea to apply anything using this type of neck construction that resists moisture on one side and leave the other unfinished. It's also going to feel a whole lot better for that test drive!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Edited by - rudy on 3/17/2015 8:17 PM

Paul Meredith


Paul

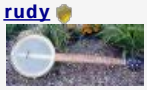
3/17/2015 10:50 PM

Like Report to Moderator

Rudy - great thread you've got here! I have a couple of questions. First, why do you install the frets with epoxy? Second, no fret leveling? I didn't do it on the banjo I'm currently working on and it seems fine.

Renton, WA
United States
997 posts since
12/24/10

rudy



Rudy
United States
7342 posts since
3/27/04

3/17/2015 11:18 PM

Like Report to Moderator

> quote:
>
> *Originally posted by Paul Meredith*
> Rudy - great thread you've got here! I have a couple of questions. First, why do you install the frets with epoxy? Second, no fret leveling? I didn't do it on the banjo I'm currently working on and it seems fine.

Hi Paul.

First, remember that the entire project is designed with "first time builder success" in mind. The fret slots are cut in a way that the fret tangs are relatively loose in the slot and epoxy is a quick, forgiving, and easy to work with method of adding frets that removes the frustration factor that is associated with first attempts at fret work.

As far as leveling, if you'll go back and review step #34 you'll see we address having the board initially level or slightly concave. If the board meets those requirements than no leveling is really necessary. Obviously for a more critical build we would take the process of checking the fret plane more seriously, but we're matching the level of complexity to the target skill level of the builder. When I do steel string banjos I find that if you address the preparation of the board before fretting then there's very little need for leveling.

Banjos in general are also more forgiving of slight fret level deviation because the action is set a bit higher than you'll typically find on an instrument such as a guitar set for minimal (low) action. All these things work in our favor for doing our first banjo.

rubicon

United States
736 posts since
2/22/09

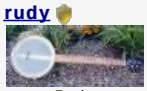
3/17/2015 11:25 PM

Like Report to Moderator

The bees wax finish looks really good !!

Edited by - rubicon on 3/17/2015 11:26 PM

rudy



Rudy
United States
7342 posts since
3/27/04

3/18/2015 8:34 PM

Like Report to Moderator

Day 10 - Mating the neck to the pot

76. Cover the area where the heel end of the dowel stick will pass through the rim and mark out the opening. I recommend directly to the front of the logo, as this is where they lap the decorative trim applied over edge of the head material. Mark a center on a 44” long piece of painter’s masking tape and mark locations 19” from the center mark in both directions. Place the center mark of the tape at the center of the dowel stick opening and wrap the tape around the rim. Mark a point halfway between these 19” indications; that will indicate the location of the dowel stick hanger bolt hole.

77. Photo sequence showing marked dowel stick hole, peeling away the outer wood print covering after scoring with a Exacto knife, drilling 1/16” holes at corners, and cutting out the opening using a Olsen 46 TPI spiral cut blade in a jeweler’s saw frame.

78. Filing the rim opening to mate perfectly with the dowel stick. Remo labels their rim material as “Acousticon” and it is very strong, but works easily.
79. The exact position of the dowel stick end is found by placing a temporary “bridge” of the desired height at the correct position and placing a straightedge between the zero fret and the bridge. Adjust the dowel stick end to produce 1/8” clearance between the 17th fret and the bottom of the straight edge and note the location of the dowel stick end.

80. The hanger bolt is screwed into a pre-drilled hole in the dowel stick center. Vise grips used as shown prevent damage to the threads where the nut will go.

81. The tuners are added; note the tape indicator to prevent drilling through the sides of the peg head slots.

82. The wood tailpiece is added using the 1-1/4” long #8-32 flat head machine screws. Two small washers are added between the tailpiece and the rim so it will sit against the trim band without being held out at an angle.

83. Time to make a simple bridge. If you look closely you’ll see that this 1/4” by 3/4” by 3” bridge blank is being held to a small stepped block with double sided carpet tape so

the sides can be sanded at an angle to reduce the thickness at the top of the bridge.

84. The bridge is laid out to match the construction drawing and the rough shape is sawn out and refined with the 80 grit 3/4" diameter sanding drum.

85. The 1-7/8" string spacing is laid out at the 1/16" wide top edge and a fine cut three cornered file is used at each marked position to make an angled notch that just touches the opposite side. The bridge is reversed in the vise and the same cut is made in the opposite side so the point of the filed vee meets directly in the middle of the edge. This produces a reliable buzz-free bridge slot that breaks cleanly away from the string is all directions. Actual "slots" are unnecessary in an instrument that has sufficient string break angle.

86. A string spacer is made and the string locations are transferred and cut into the spacer. String 1 and 4 are placed 1/8" from their respective edges and the 4 string locations are marked with equal distances between them. Part of the beauty of the use of a zero fret is that the slots aren't critical, as long as they are deep enough to allow the string to bear against the zero fret.

Time to string up, tune, and play a bit to make sure everything is satisfactory. When we're satisfied that we know exactly what if any revisions that we wish to make it's time to disassemble completely, refine anything that needs additional work, sand, complete the finish application, and reassemble.
You're done!

P.S.:

More to come… (You're going to need a sound sample, right?)


76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78


79


80


81


82


83


84


85


86

rudy

Rudy
United States
7342 posts since
3/27/04

3/20/2015 3:18 PM

2 people like this Like Report to Moderator

Here's a quick demo (Cumberland Gap 3 part version) of aforementioned banjo strung with 20/30/40/50/20 pound test fishing leader:

Edited by - rudy on 3/20/2015 3:20 PM

Yanni

Ian
Morecambe, United Kingdom
180 posts since 7/4/13

3/20/2015 5:45 PM

Like Report to Moderator

Awesome Randy, it sounds great :) Thanks very much for the series.

Ian

Tim13

Tim
South West, MI United States
1916 posts since 4/1/08

3/20/2015 8:46 PM

Like Report to Moderator

Maybe I missed it. What was the cost of the materials?

Page: 2 **of 3**

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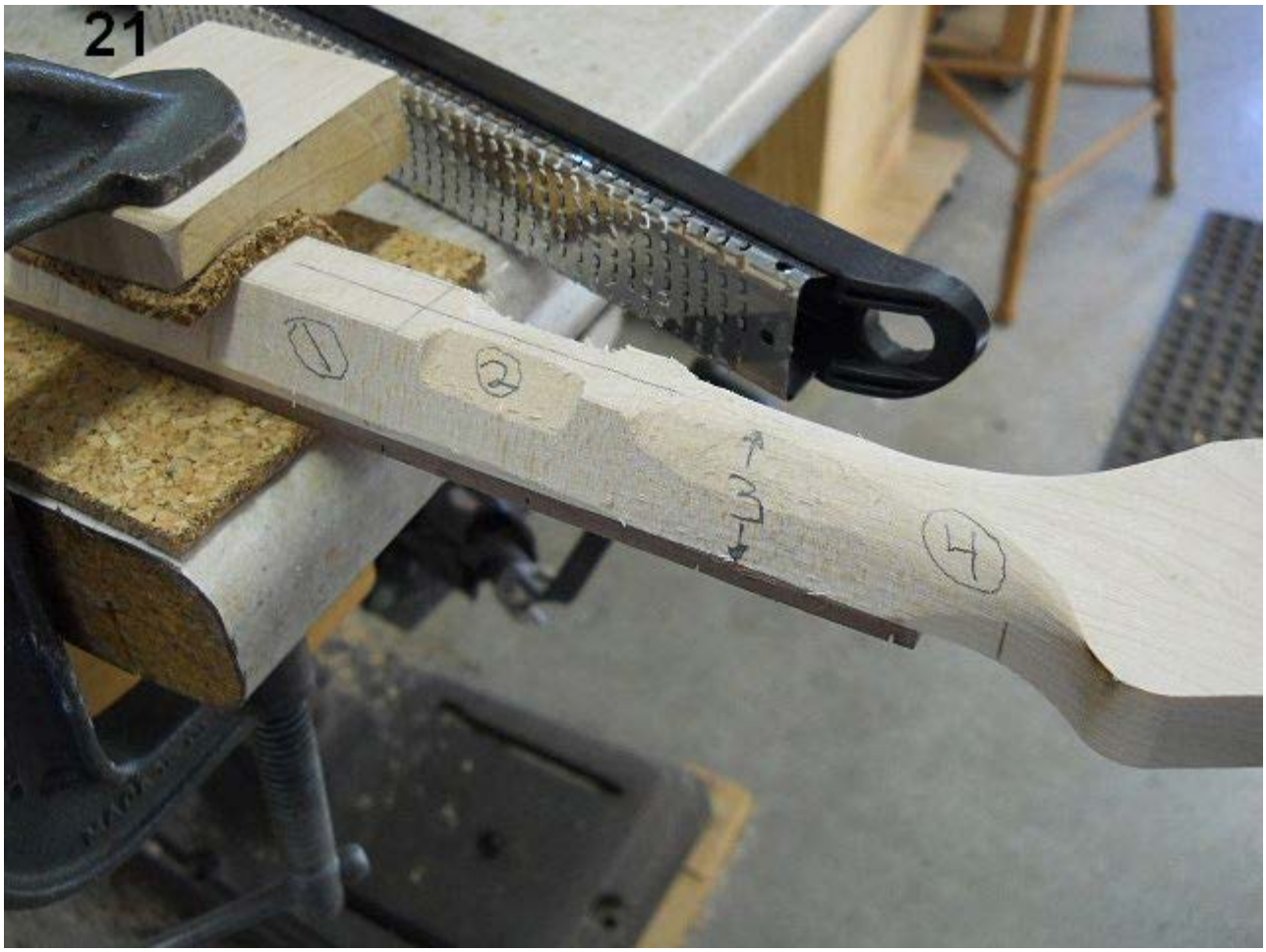
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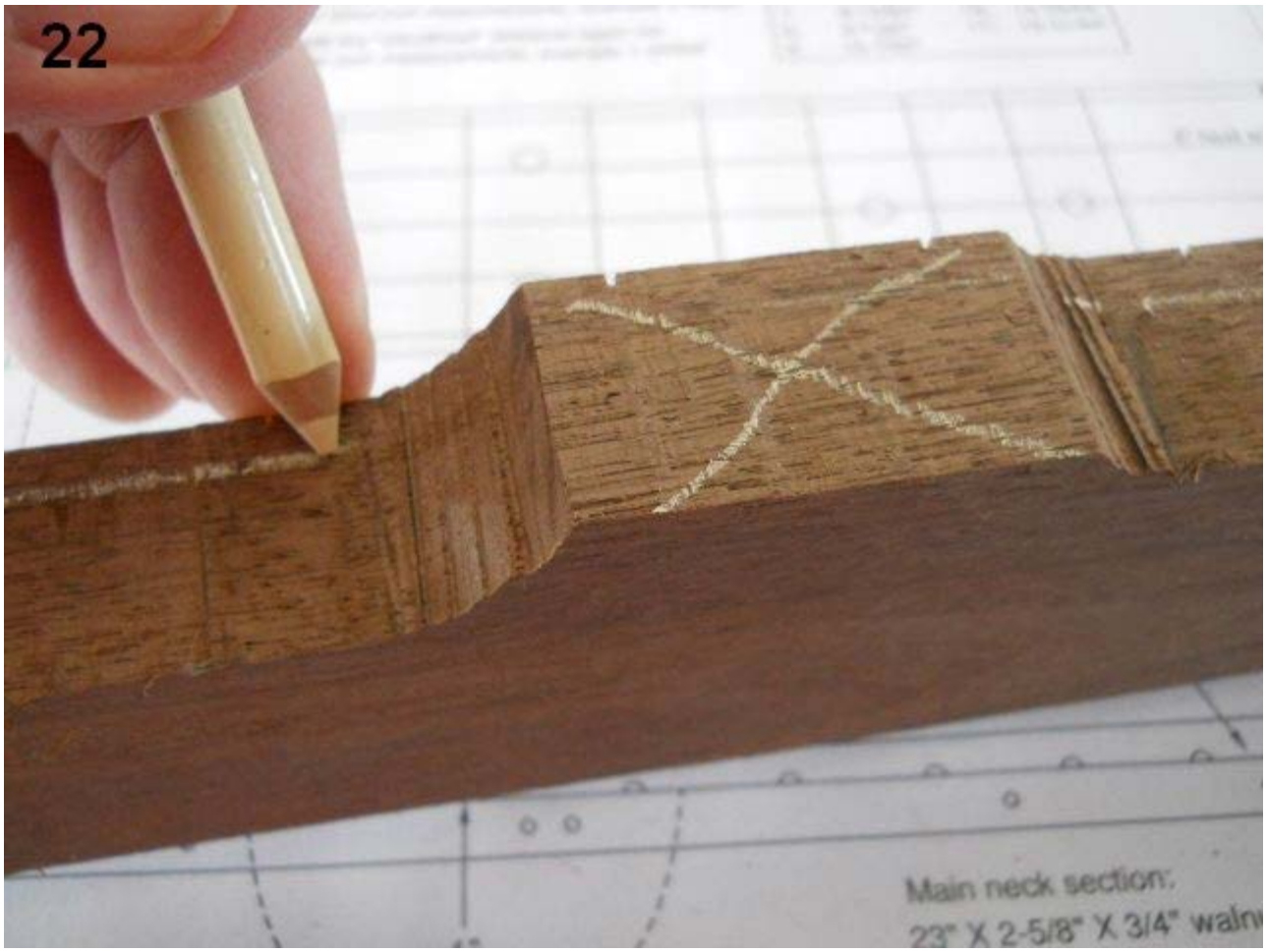
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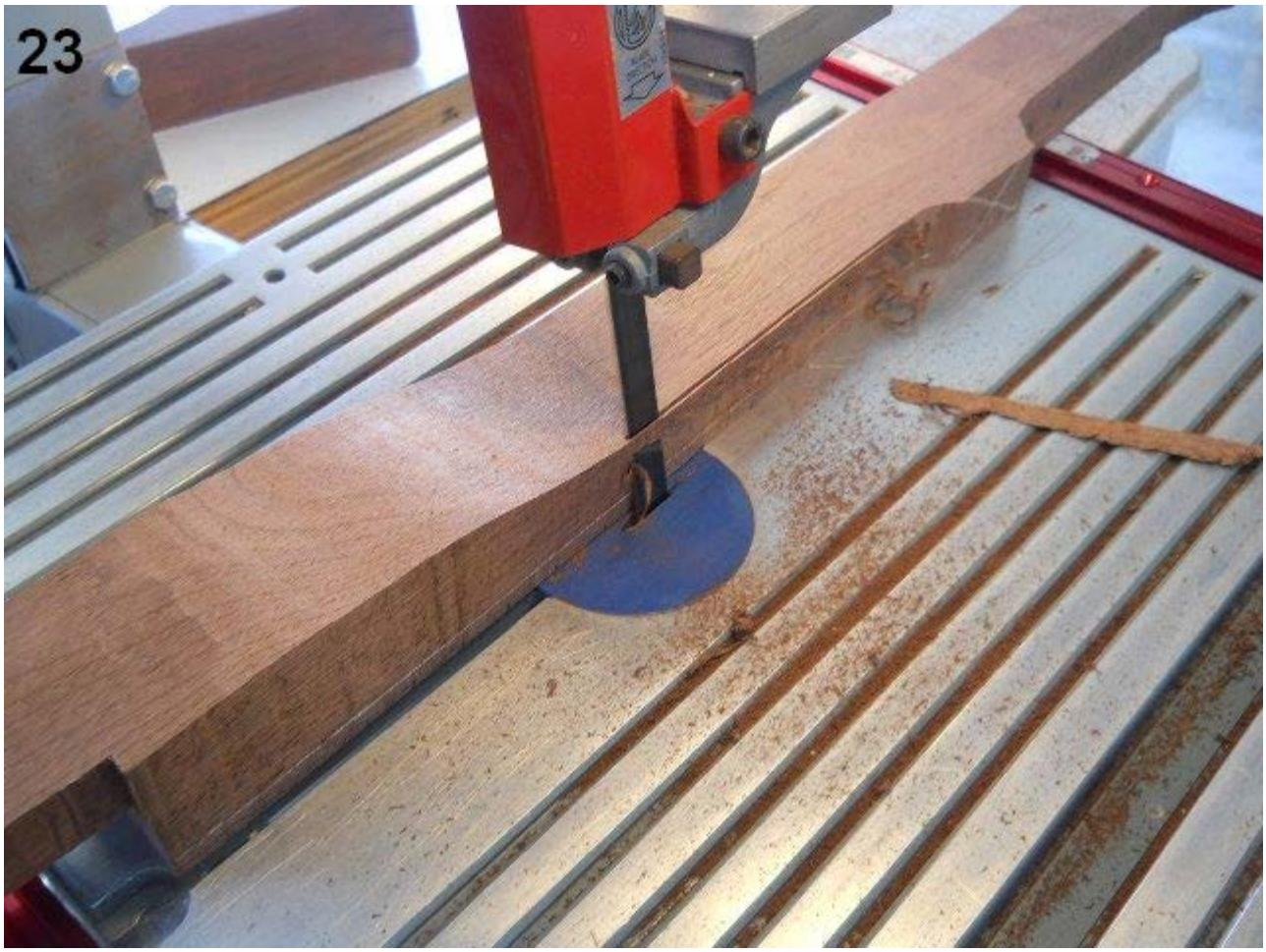
Main neck section: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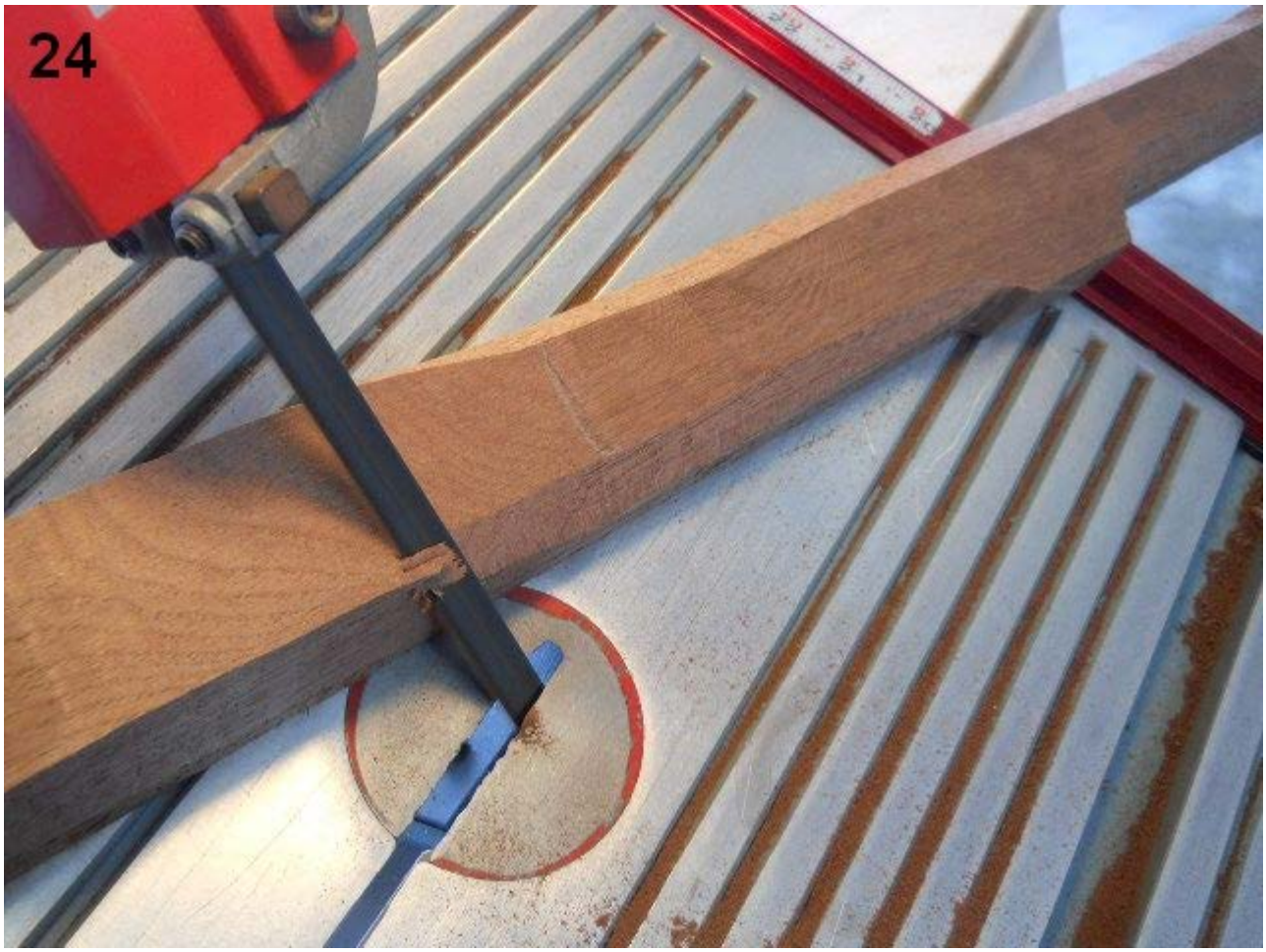
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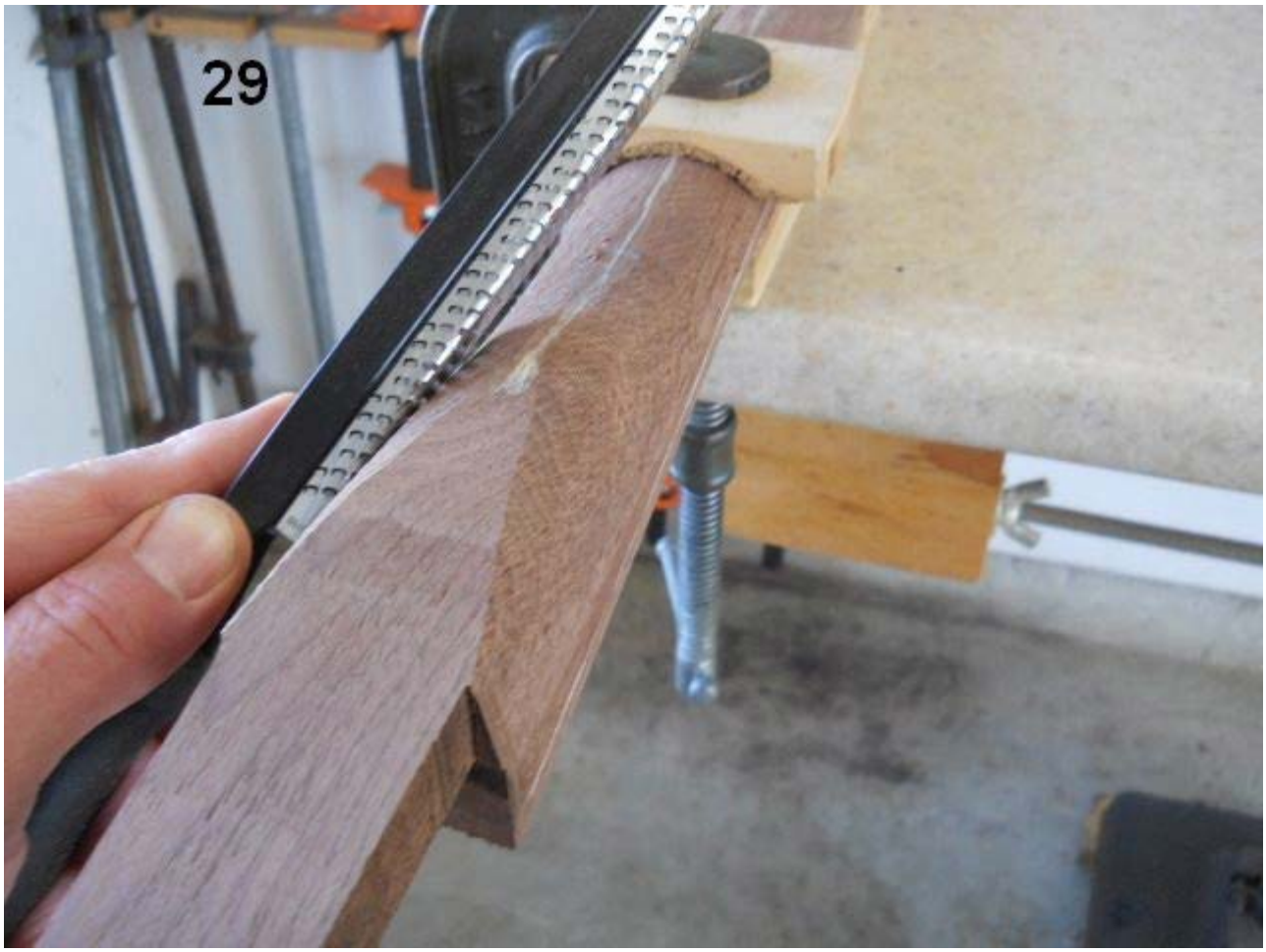
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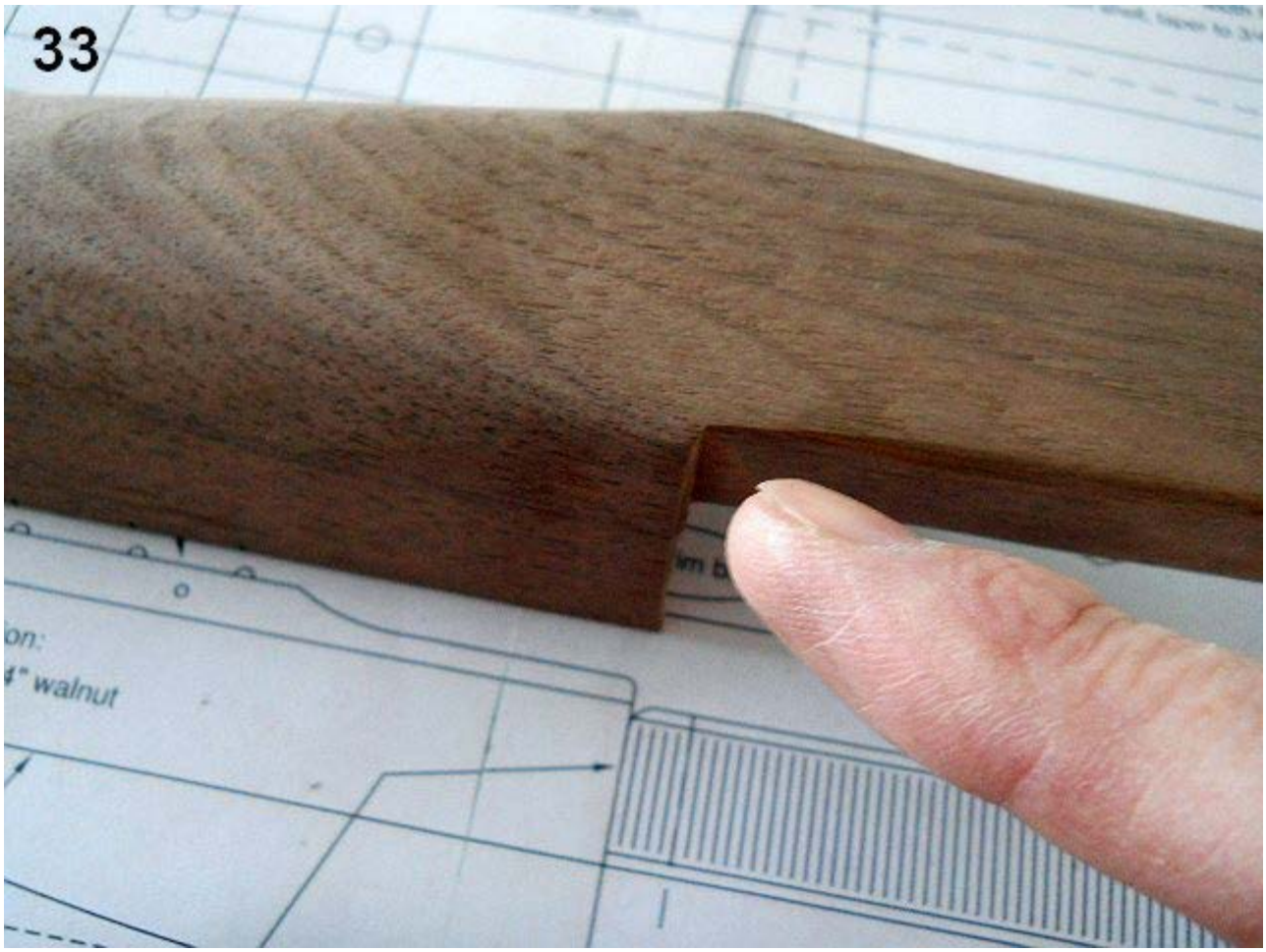
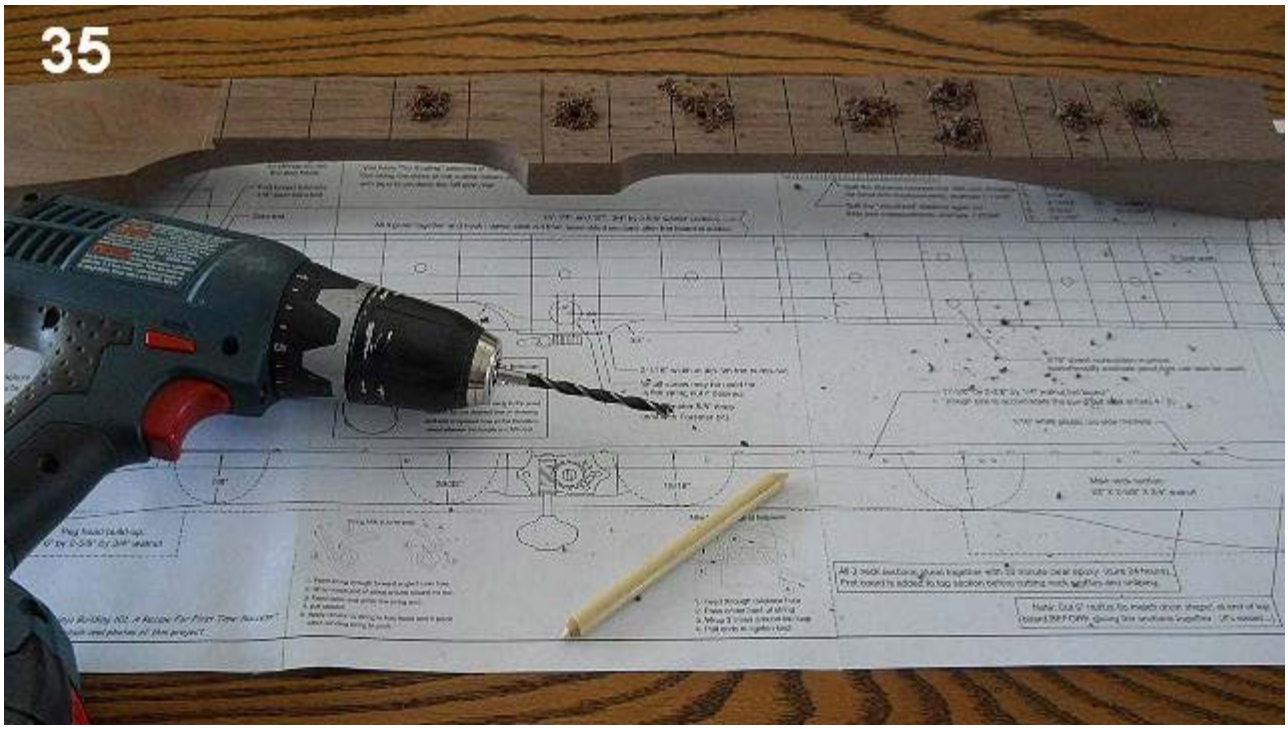

33
walnut


34

3035-249171232015.jpg 640×360 pixels



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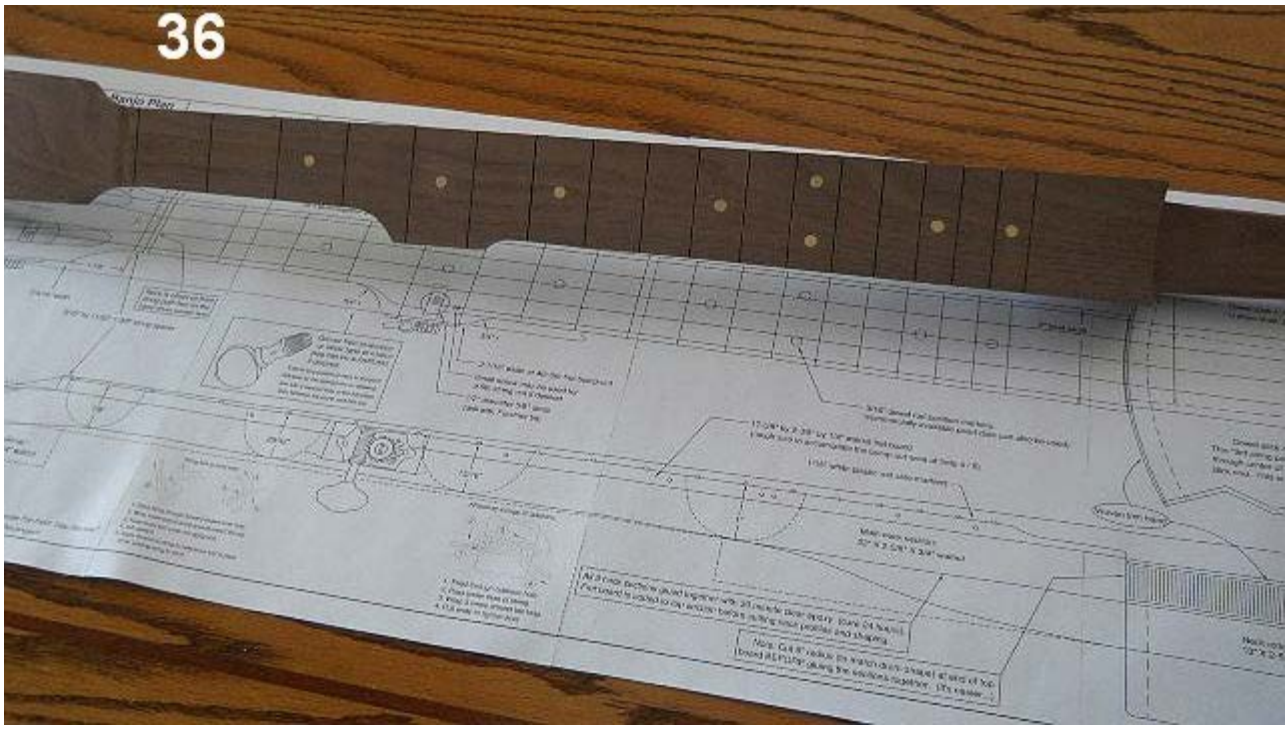
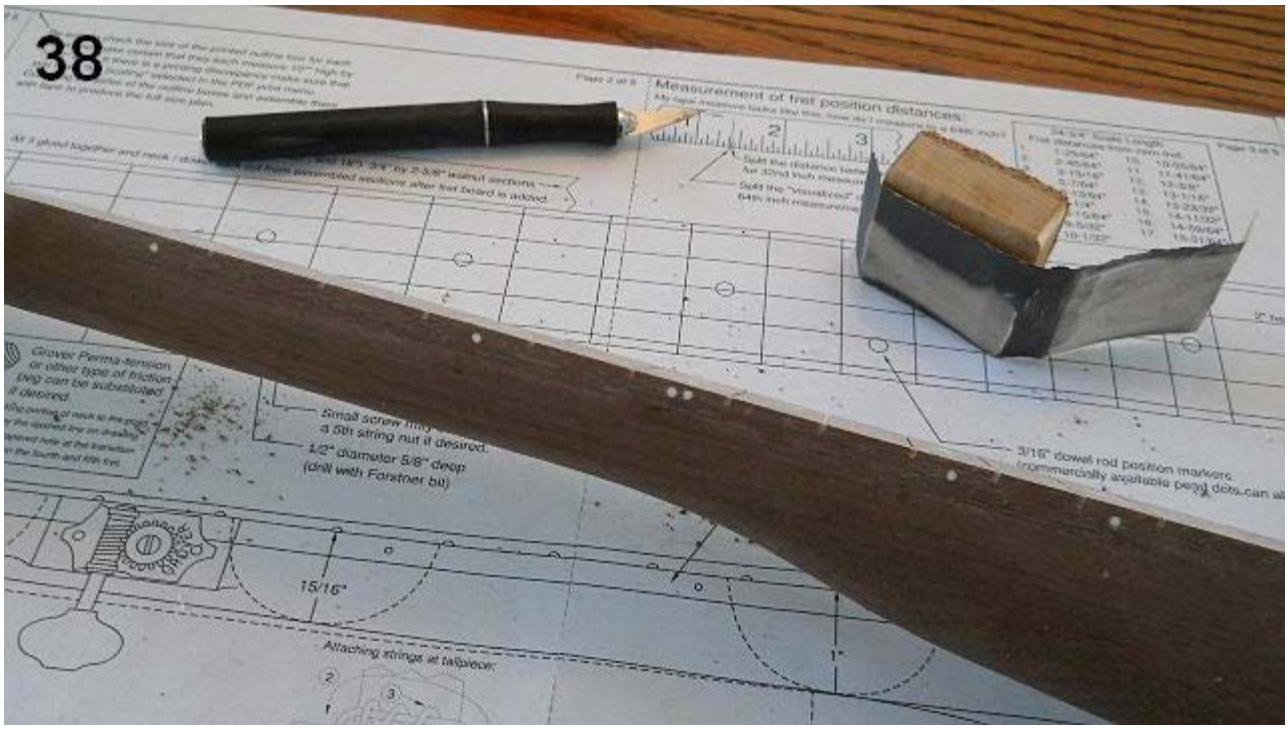
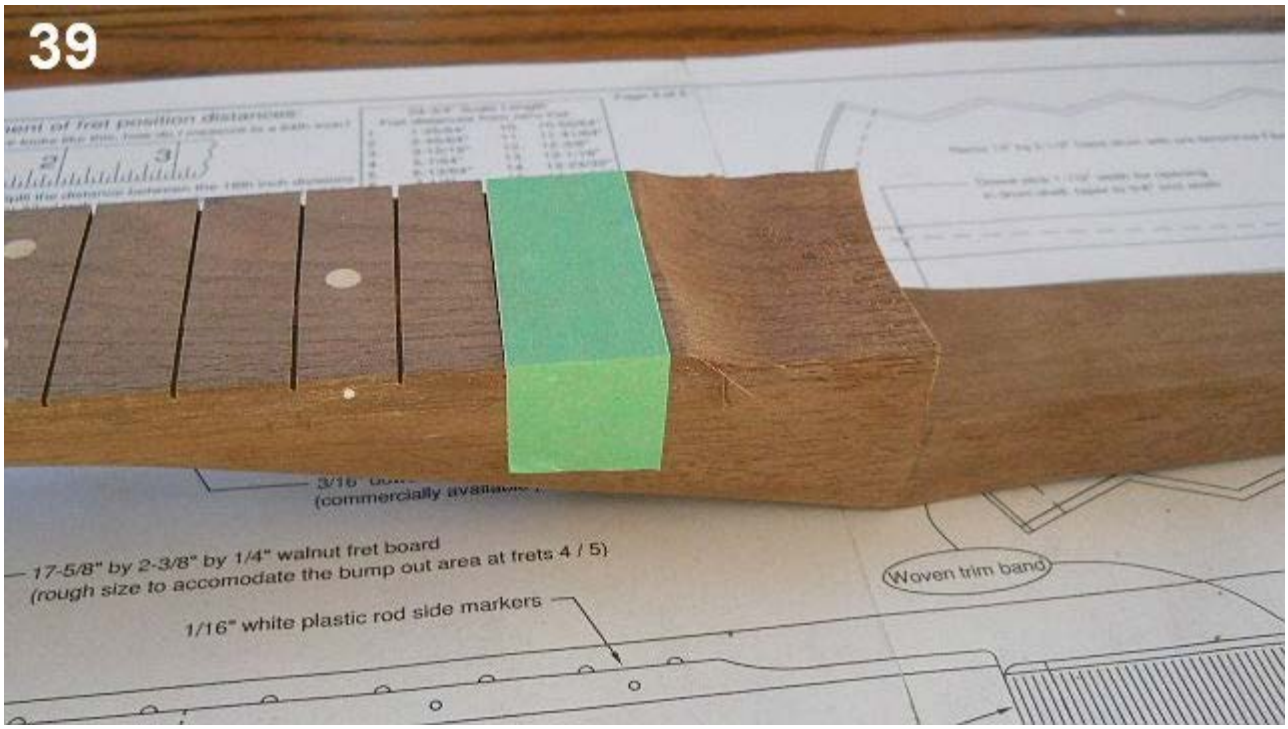
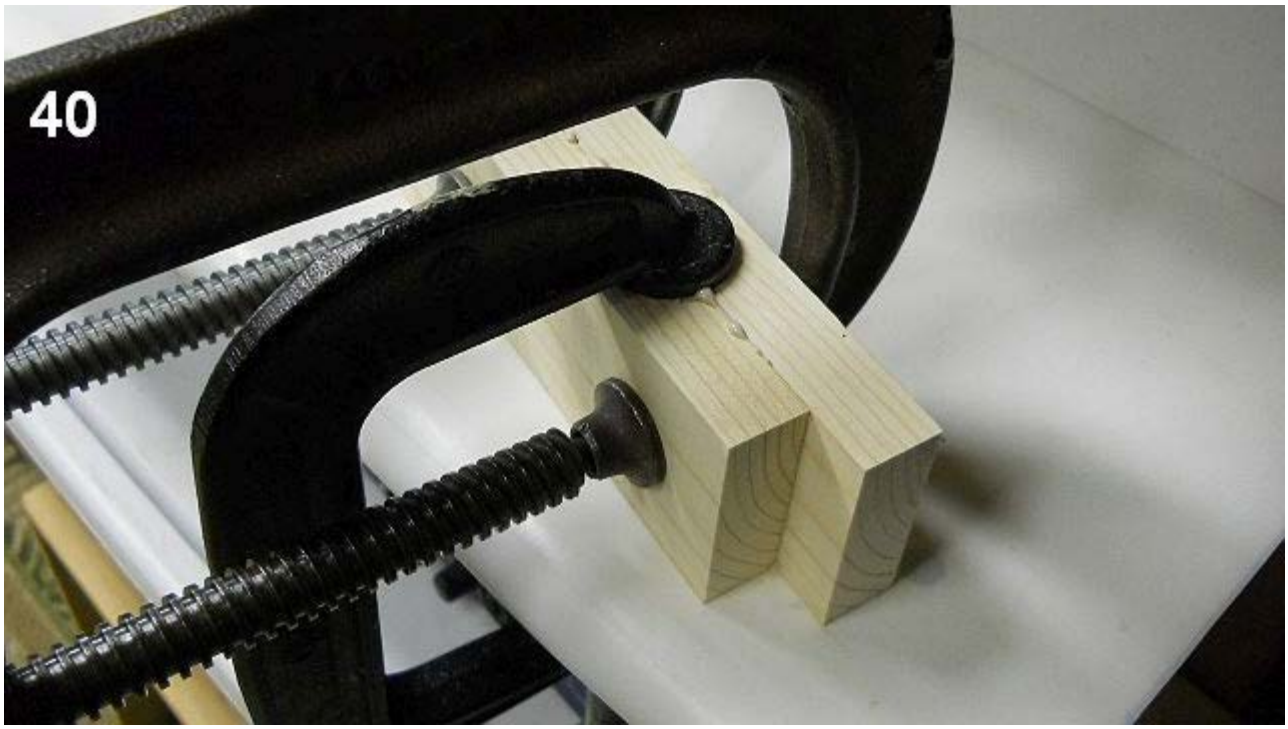


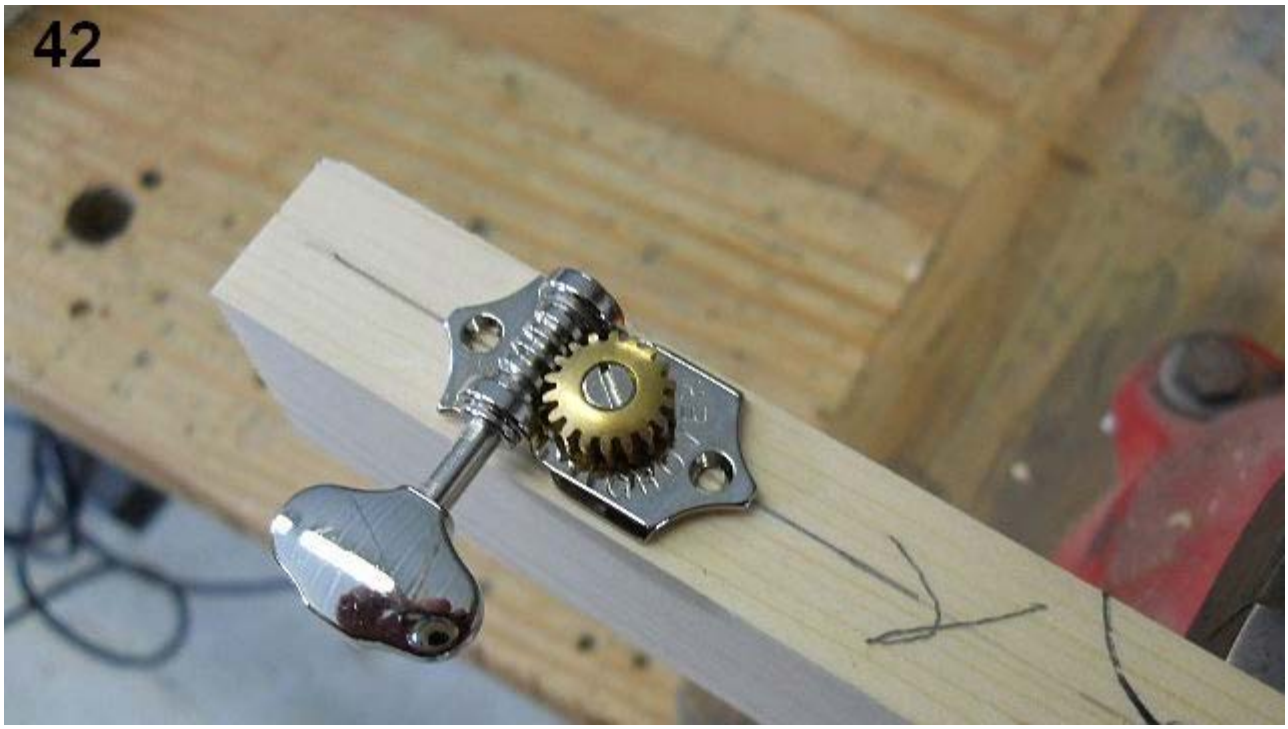

37


38
Measurement of fret position distances:
Grover Perma-tension
or other type of friction
peg can be substituted
if desired.
small screw fitted
a 5th string nut if desired.
1/2" diameter 5/8" deep
(drill with Forstner bit)
3/16" dowel rod position markers
15/16"
Attaching strings at tailpiece:


39
17-5/8" by 2-3/8" by 1/4" walnut fret board
(rough size to accomodate the bump out area at frets 4 / 5)
1/16" white plastic rod side markers
Woven trim band


40


41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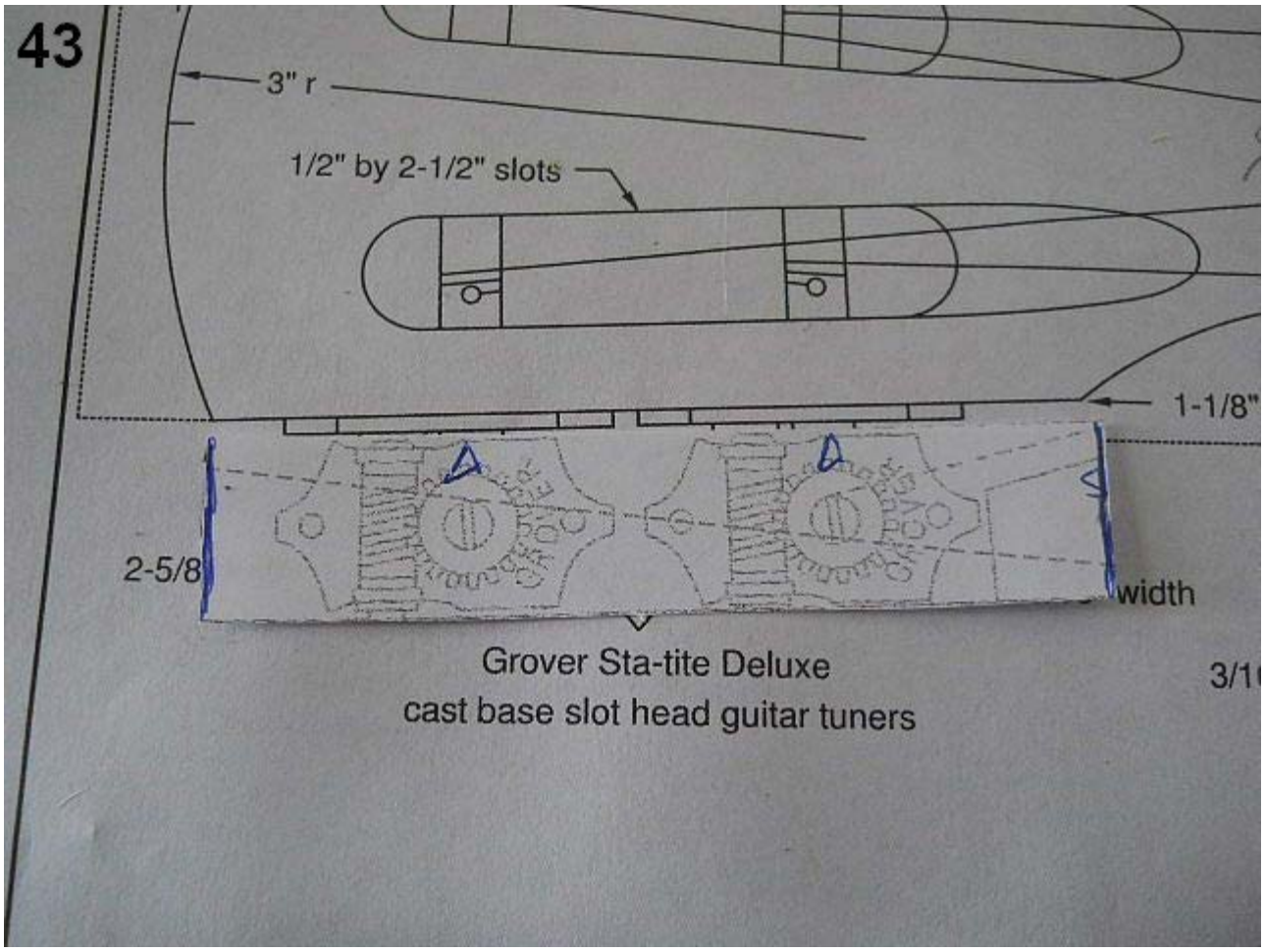
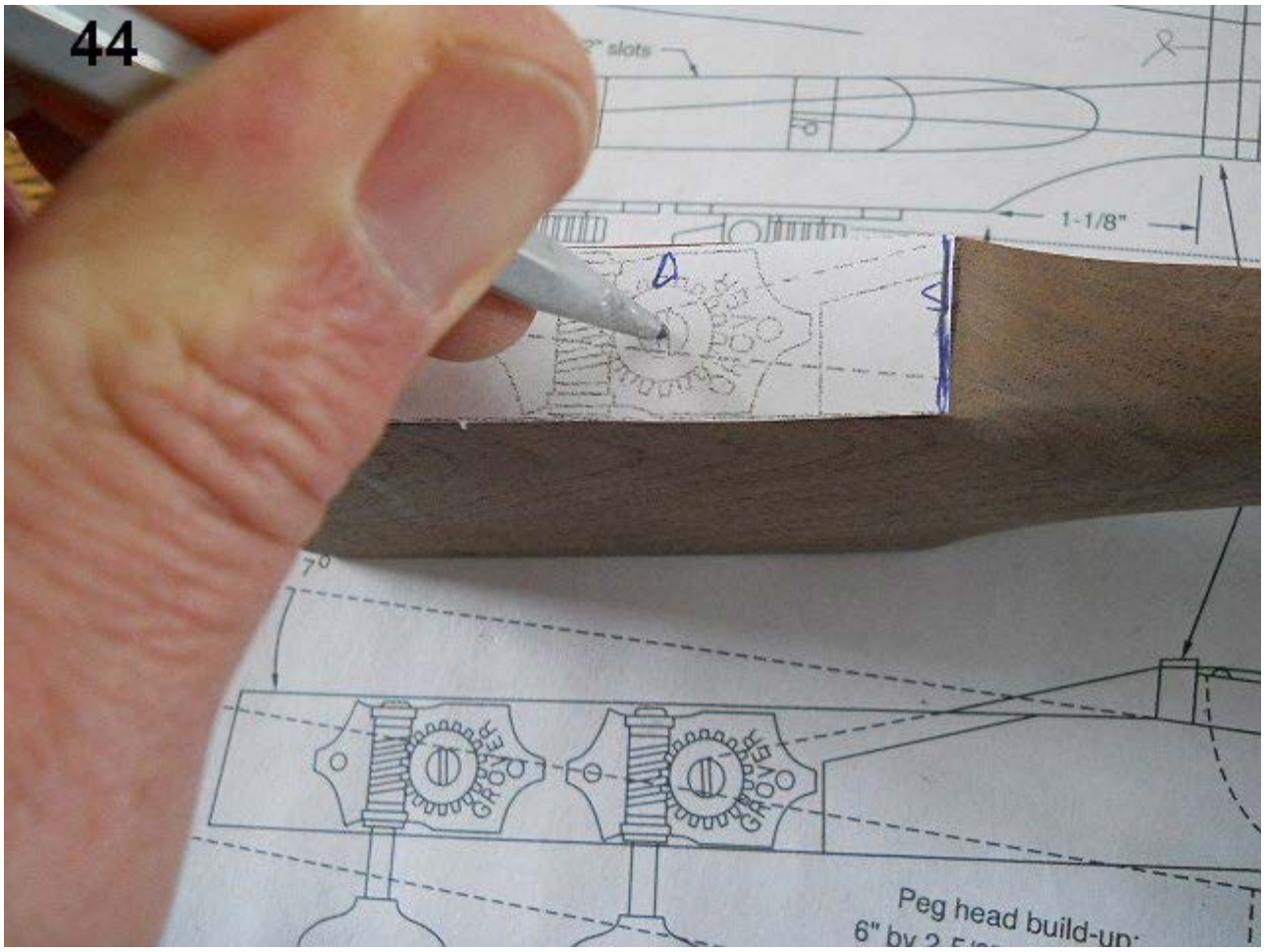
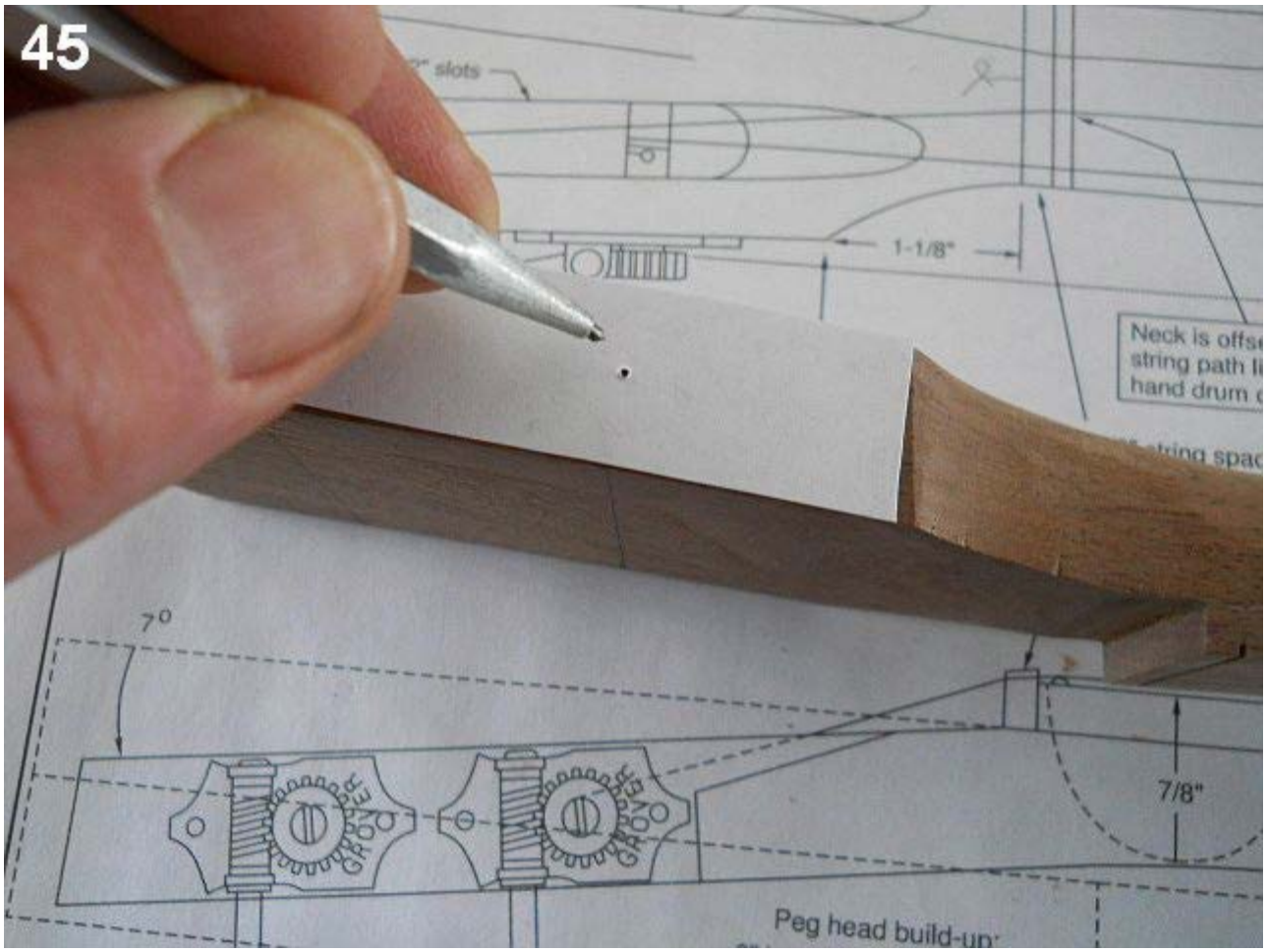
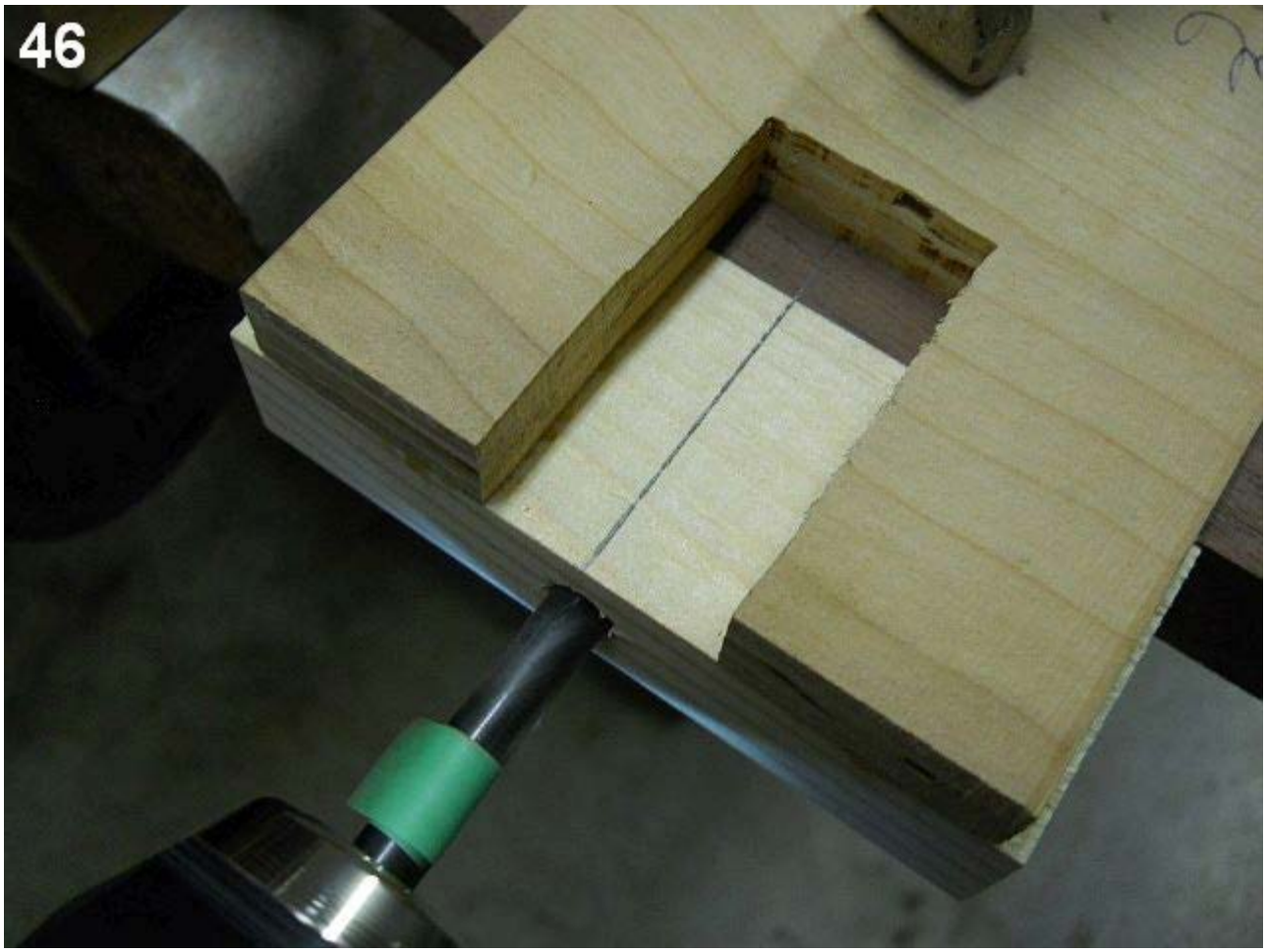
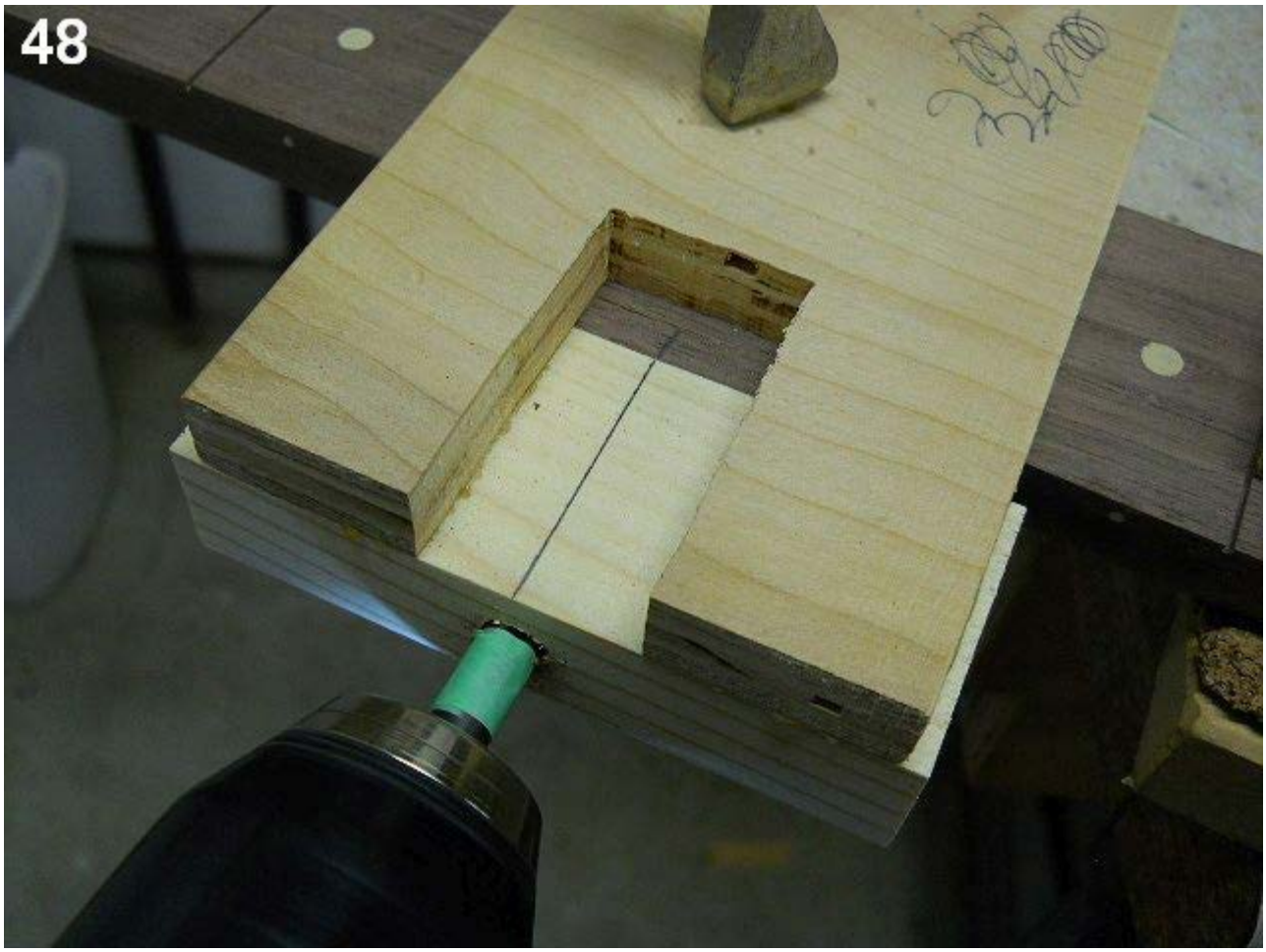

43
3" r
1/2" by 2-1/2" slots
1-1/8"
2-5/8
width
Grover Sta-tite Deluxe
cast base slot head guitar tuners


44
slots
1-1/8"
7°
GROVER
GROVER
Peg head build-up:


45
slots
1-1/8"
Neck is offs
string path li
hand drum
7°
7/8"
Peg head build-up


46


47

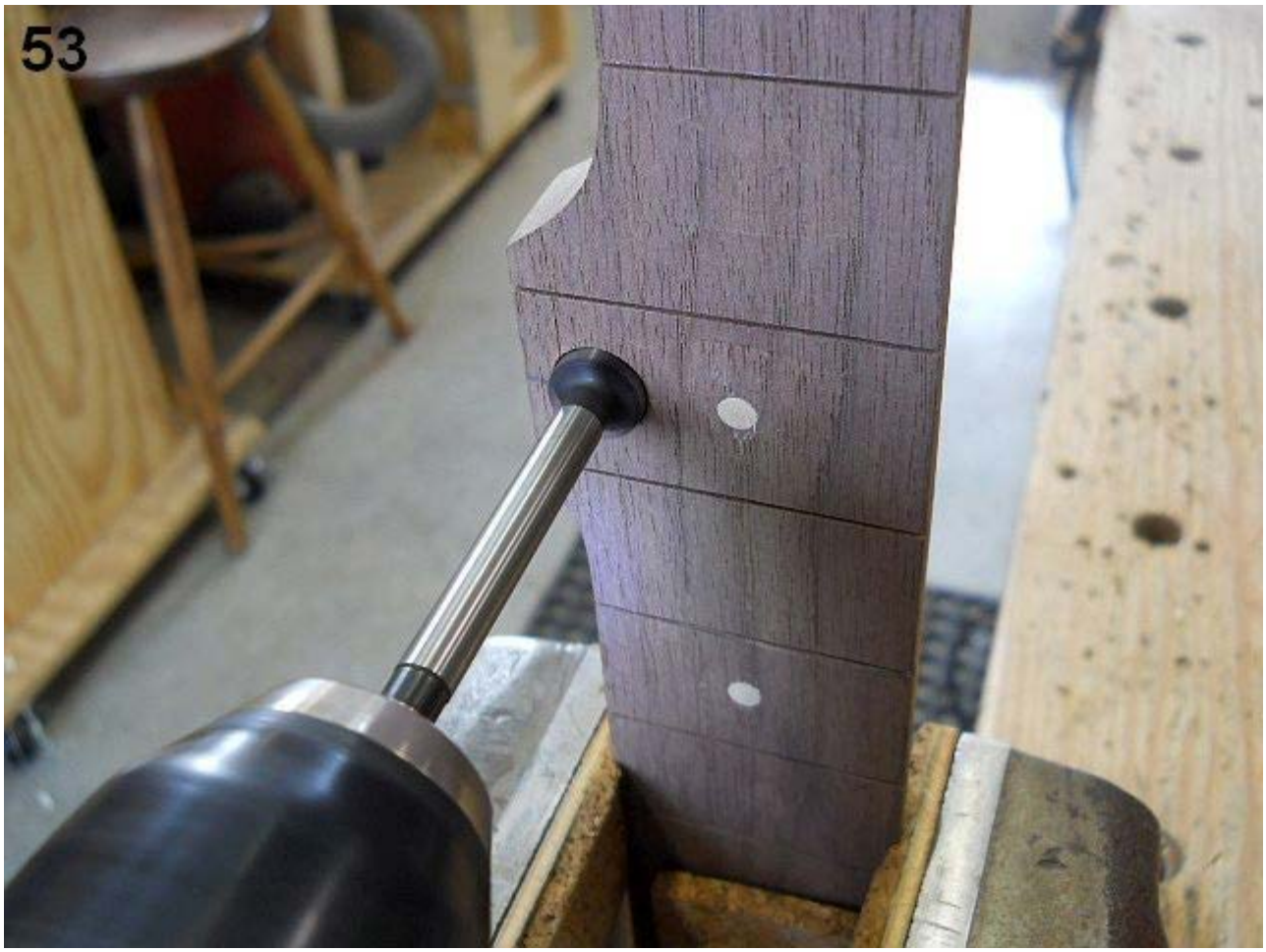

48


49


50


51
Empire
MM
10ths
TEMPERED

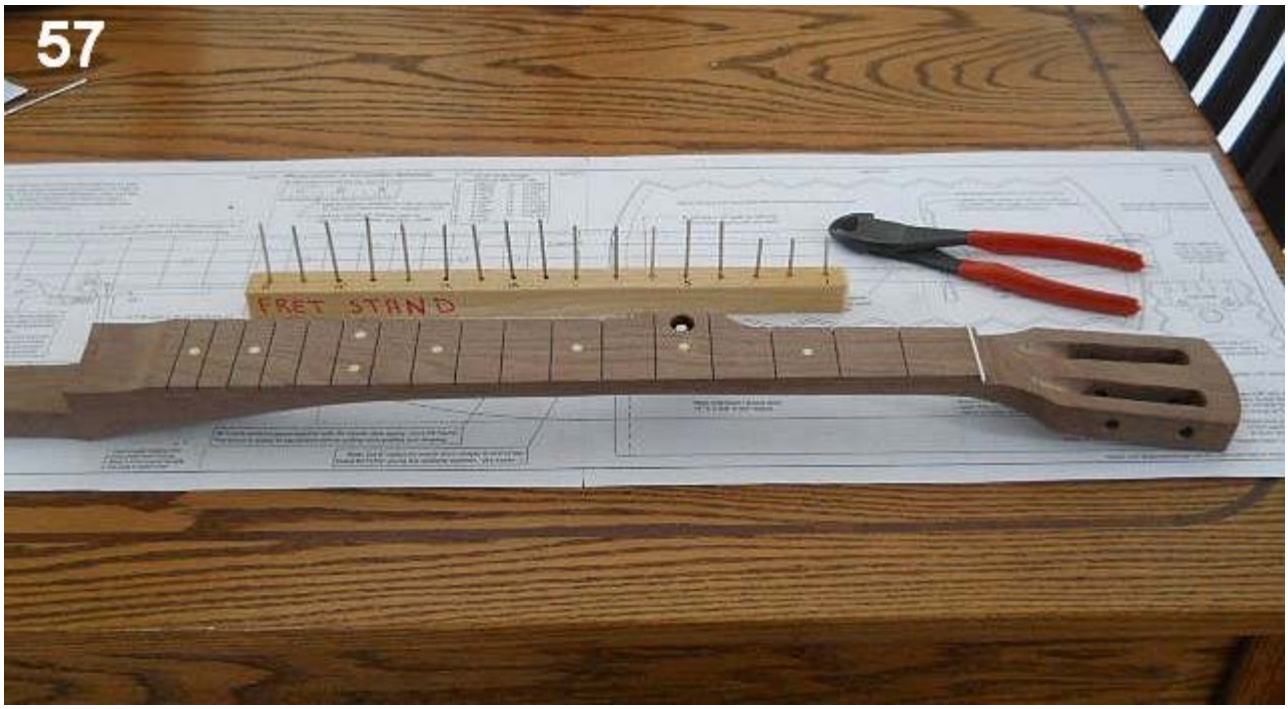

52

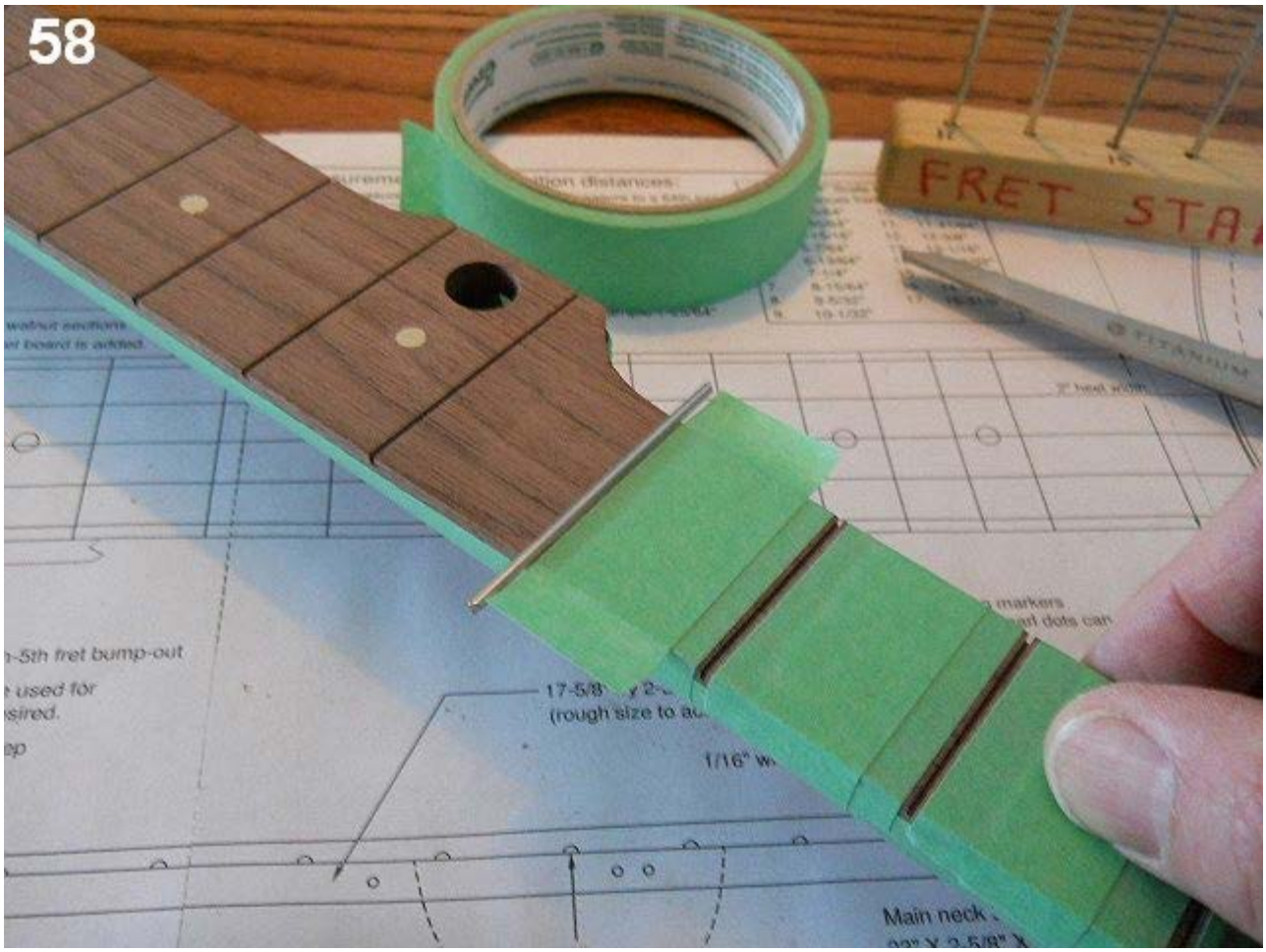

53

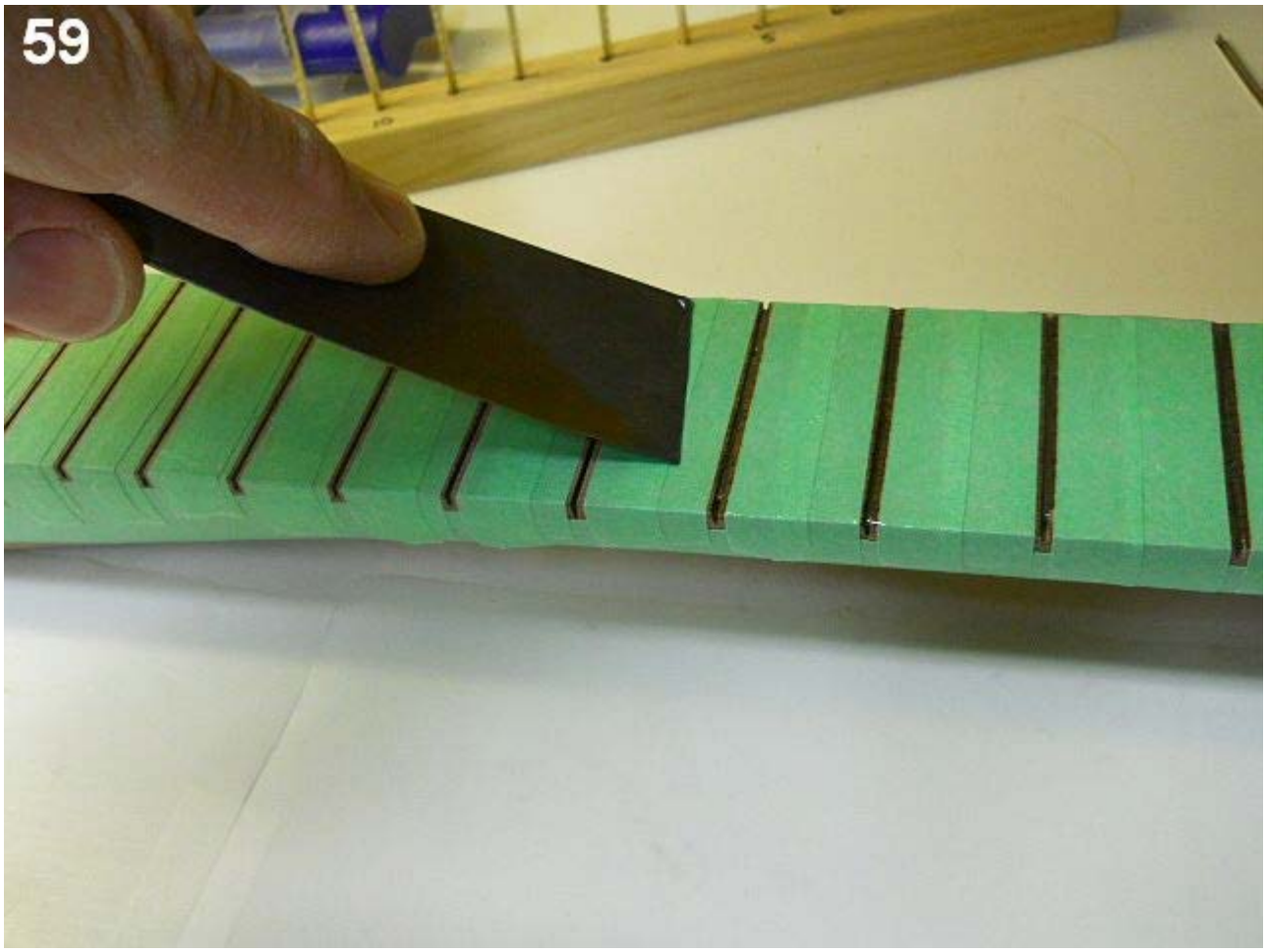

54

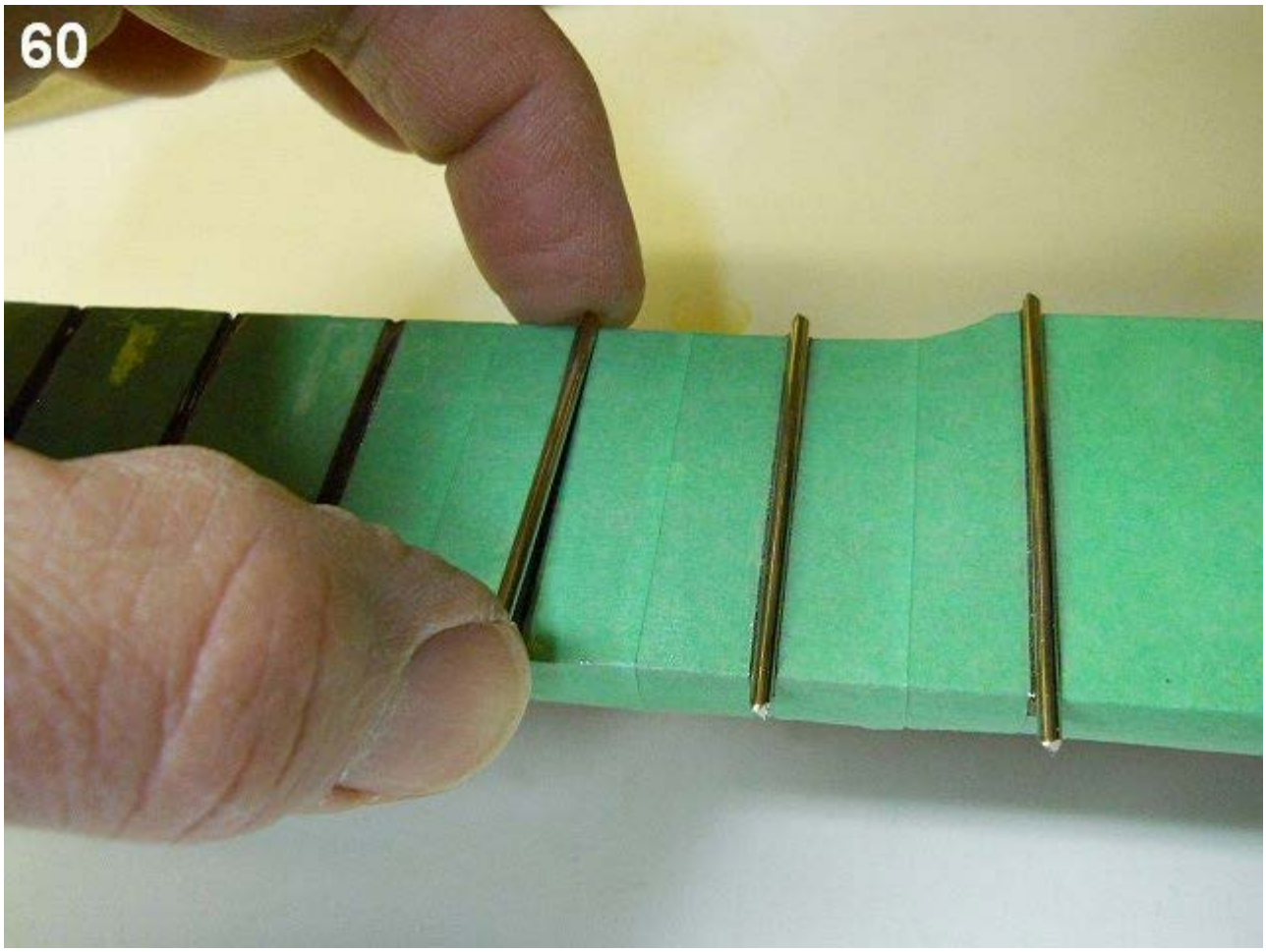

55


56
Stewart MacDonald
#150
Stewart-MacDonald
stewmac.com
#149
Wide/medium
STEWART • MACDONALD
#764
FRETWIRE
0.063"
0.032"
0.022"
Stewart-MacDonald
stewmac.com
#148
Medium
guitar fretwire

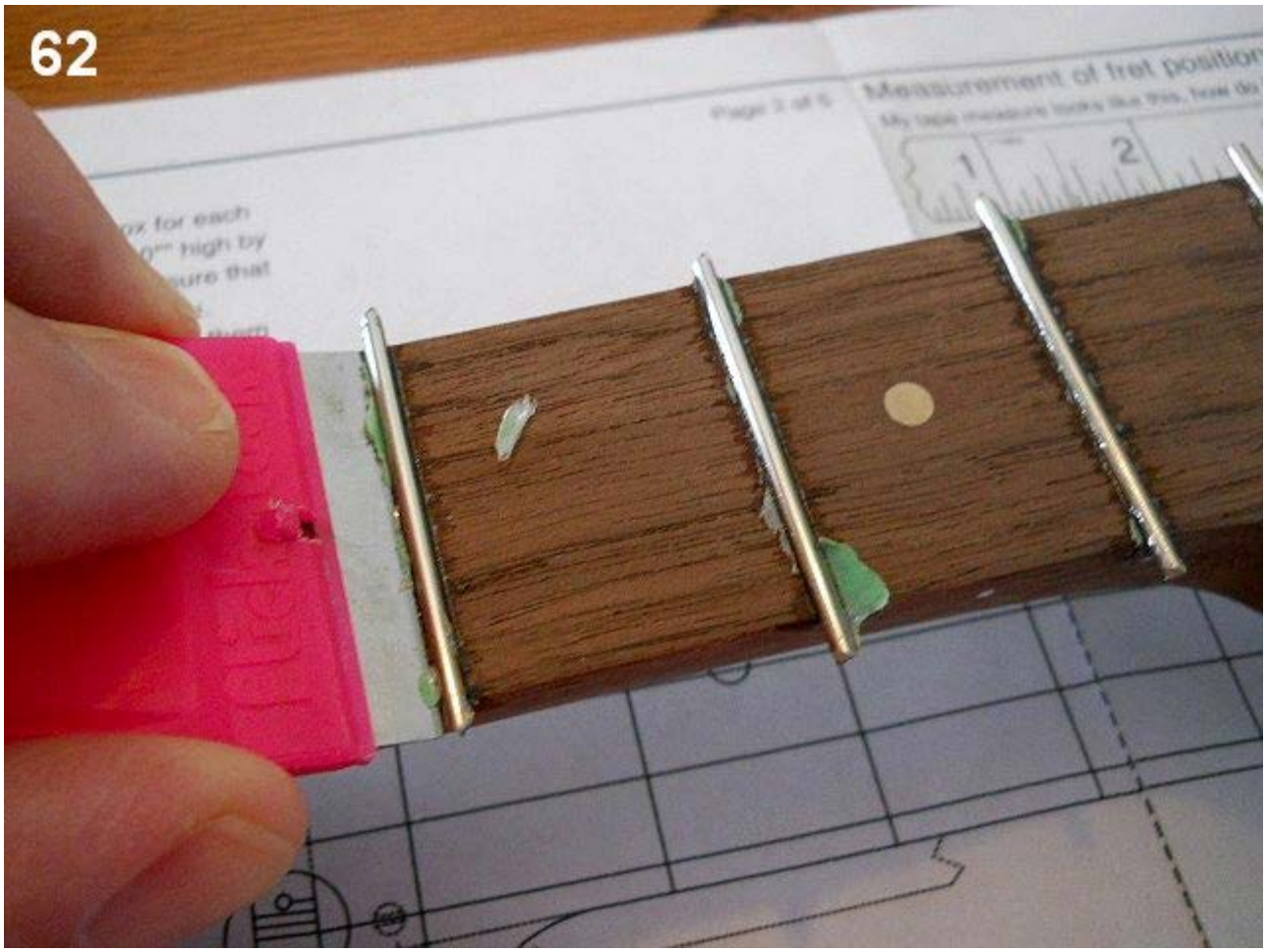

57
FRET STAND

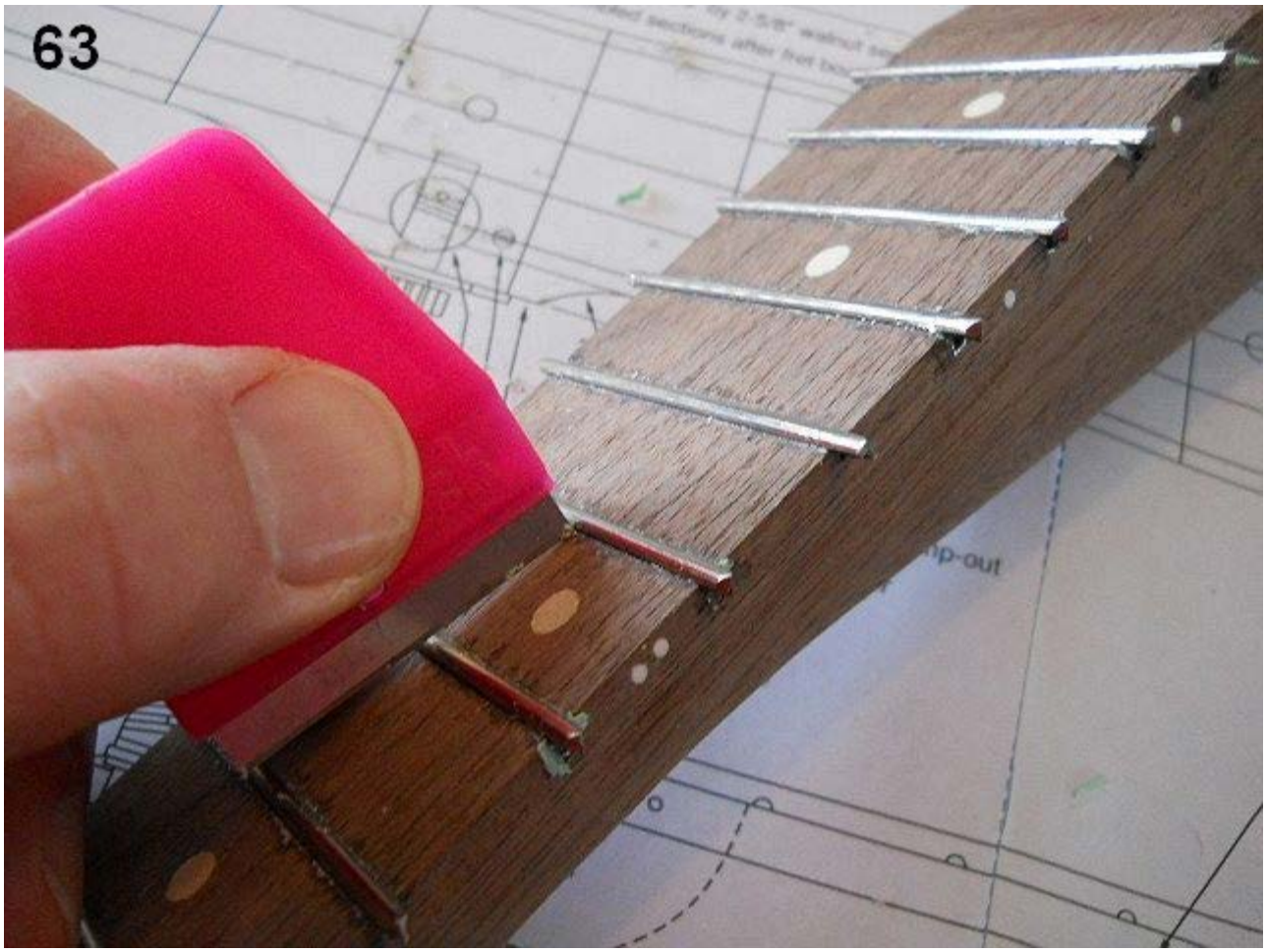

58
FRET STA
TITANIUM
-5th fret bump-out
used for
sired.
markers
dots can
17-5/8
(rough size to a
1/16" w
Main neck

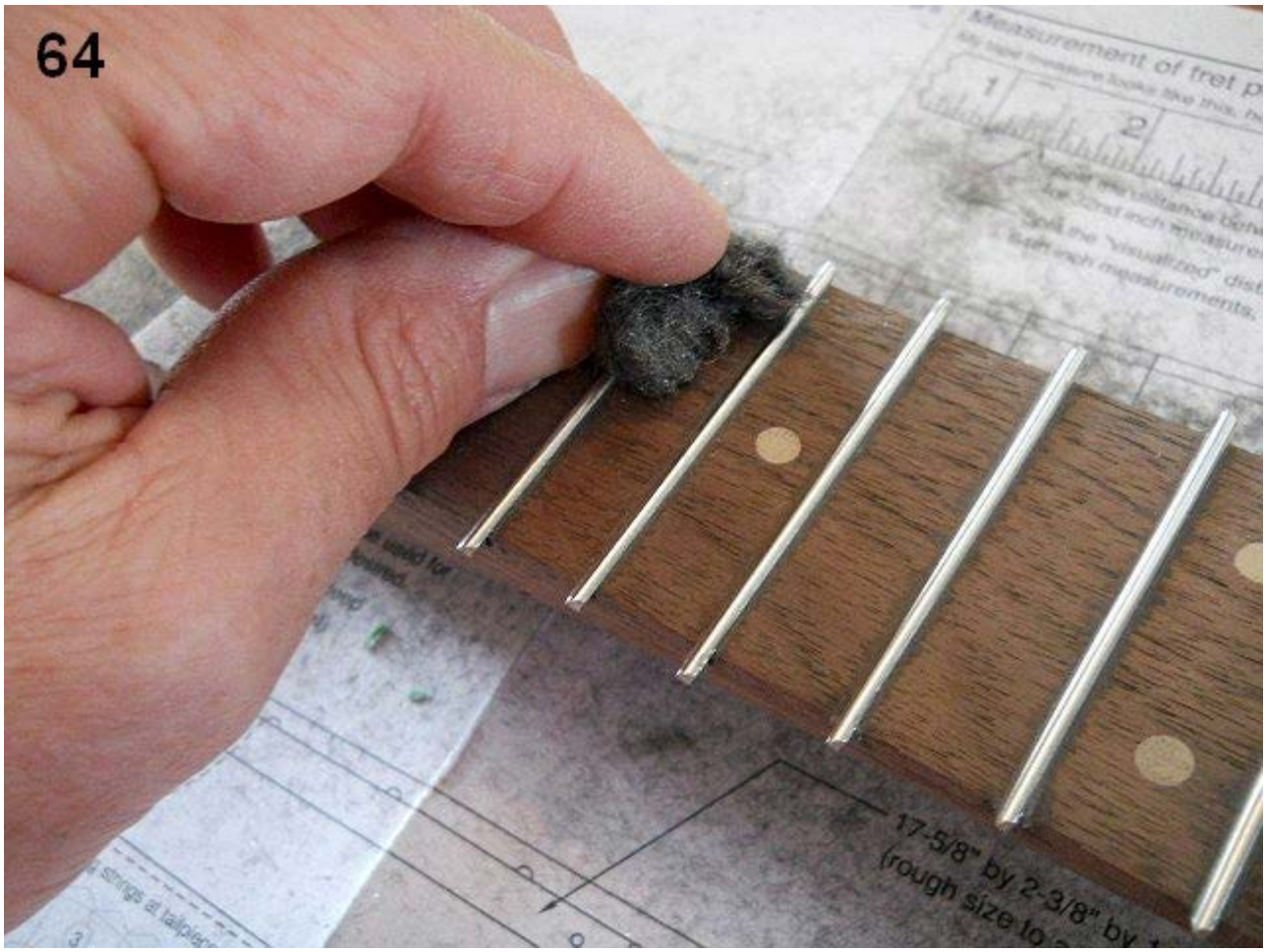

59


60


61
RET STAND

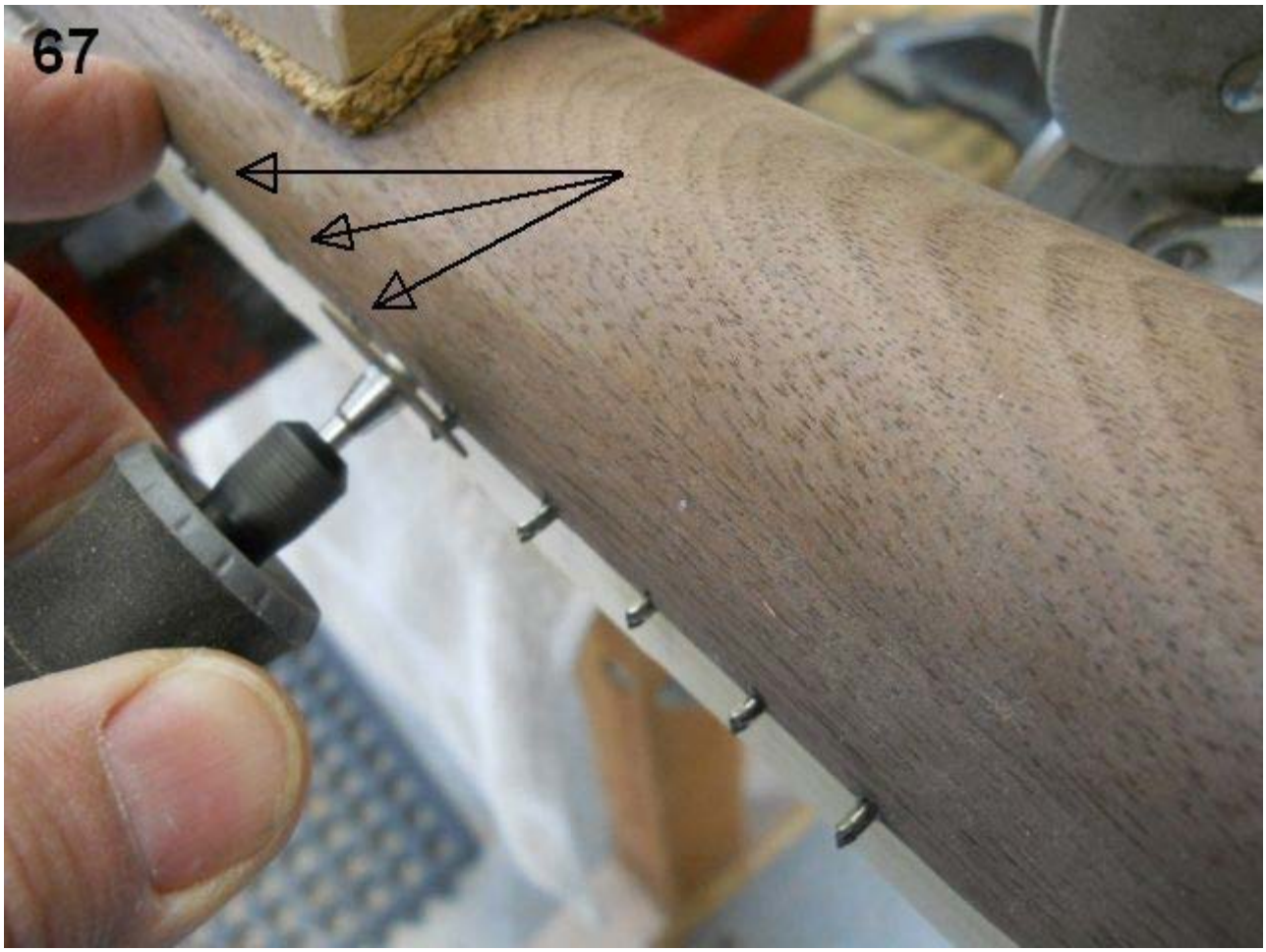

62
Measurement of fret position


63


64
Measurement of fret p
17-5/8" by 2-3/8" by
(rough size lo


65


66


67


68


69


70
SAFE


71


72


73


74

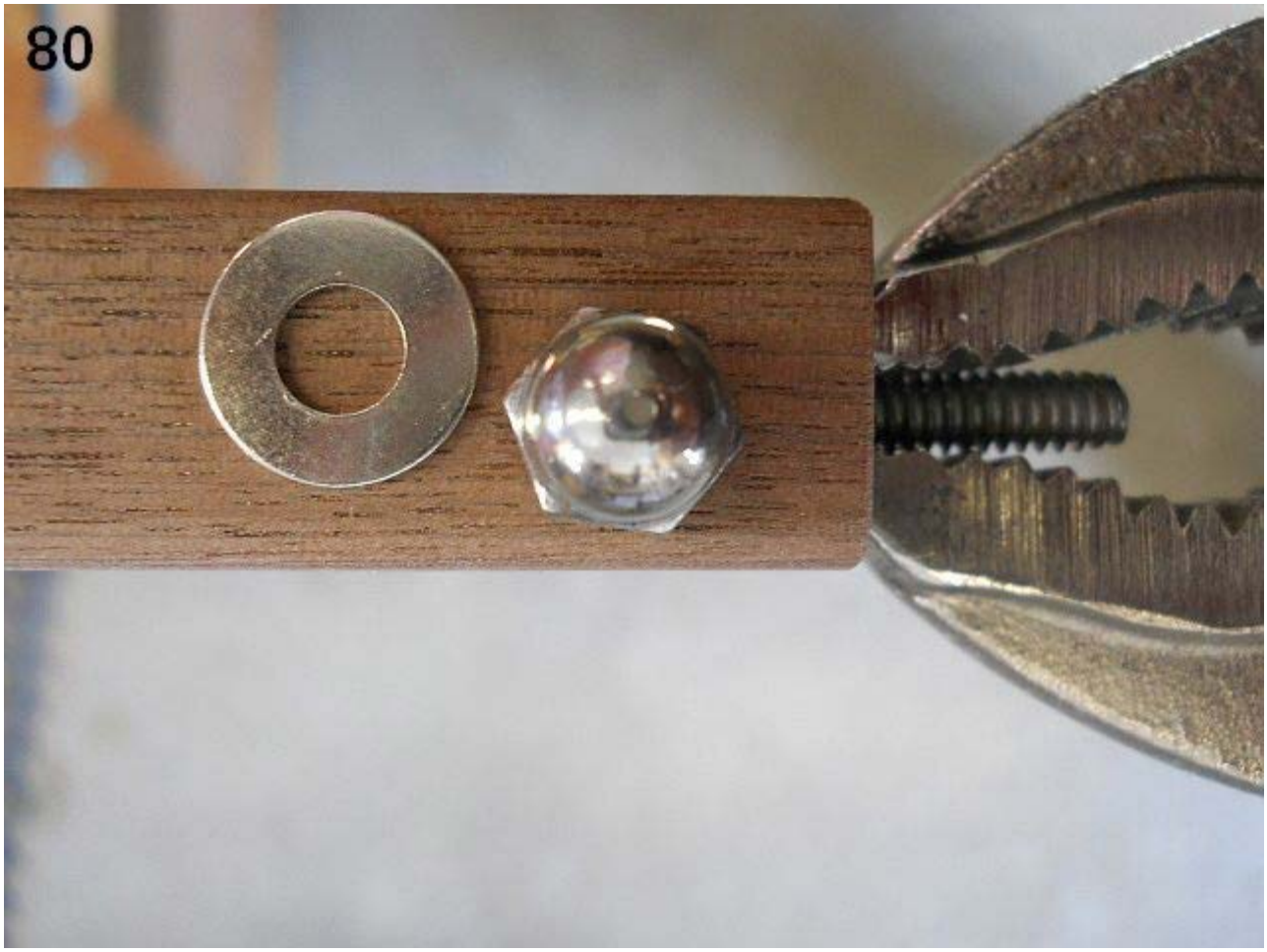

75


76
19"
19"


77

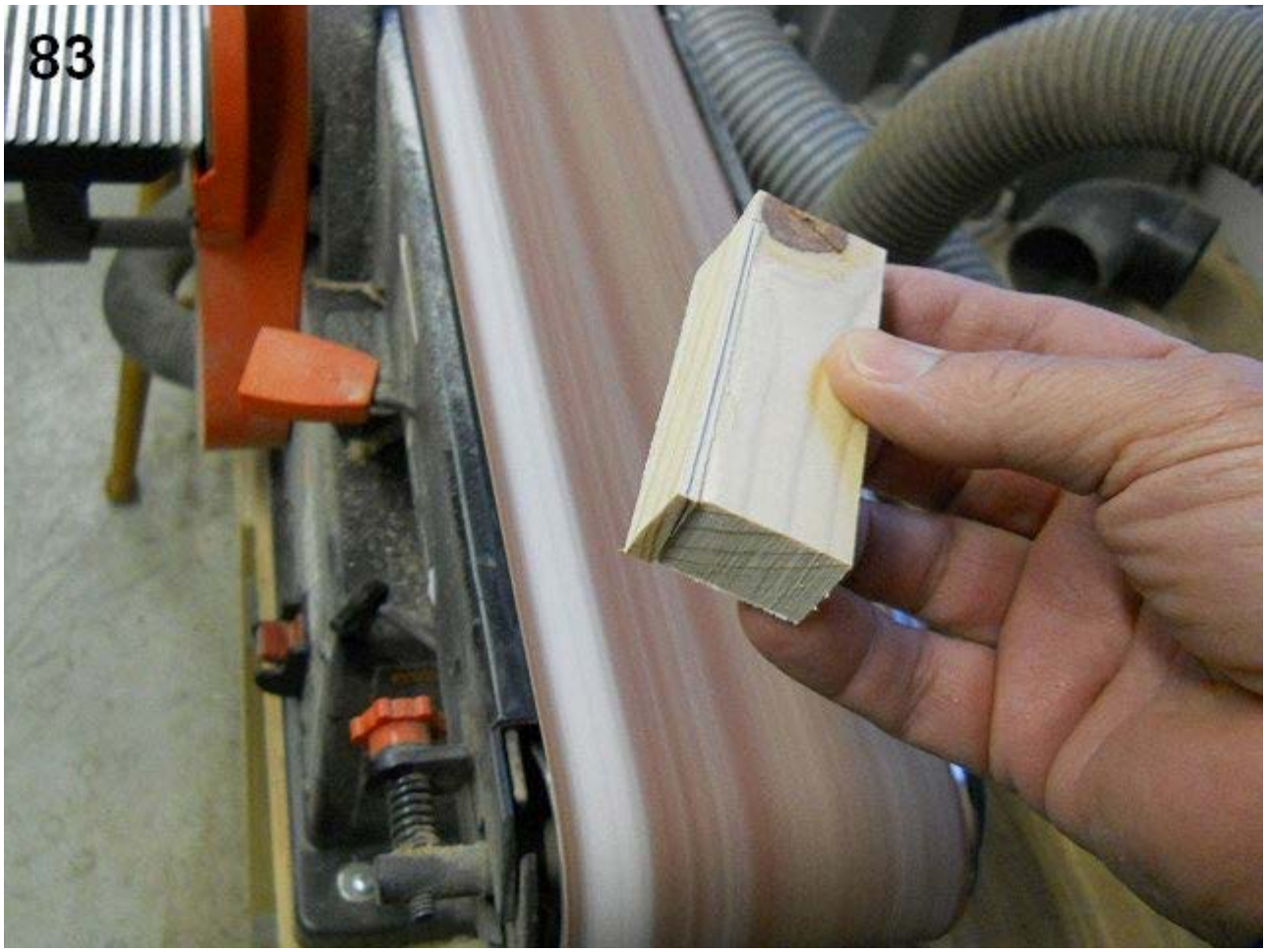

78


79
J48


80

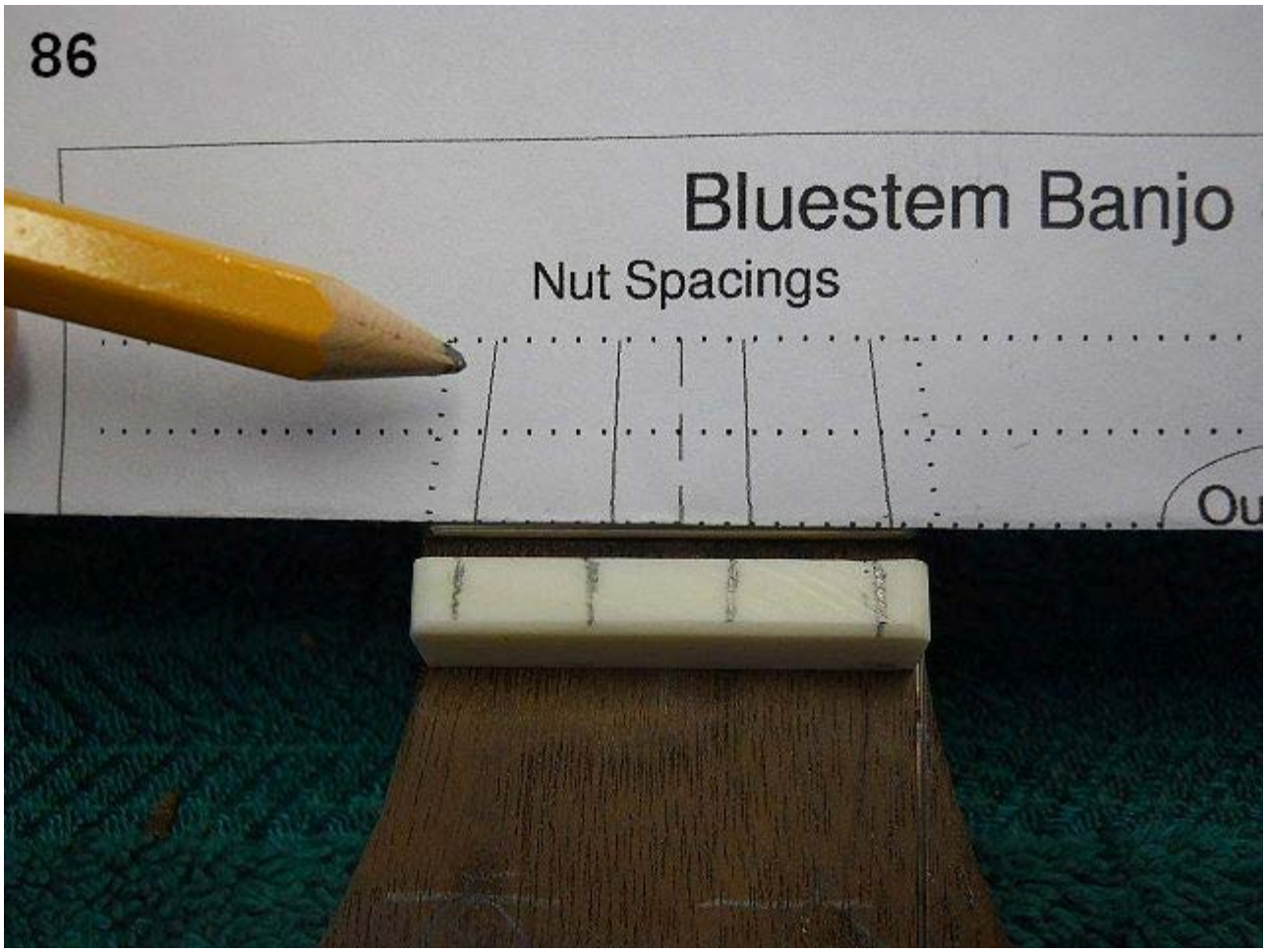

81


82


83


84


85


86
Bluestem Banjo
Nut Spacings